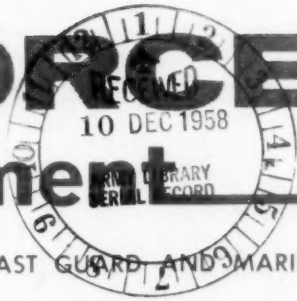


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# ARMED FORCES management



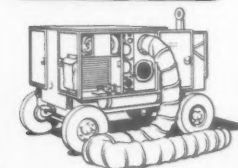
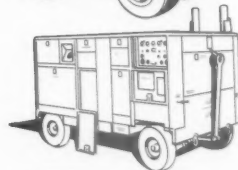
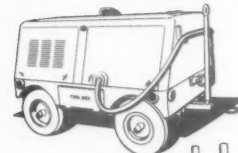
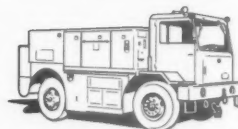
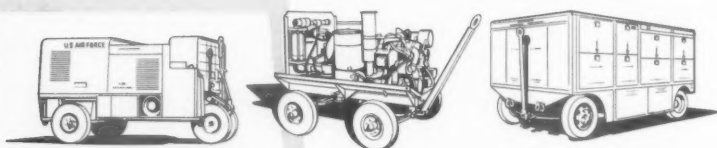
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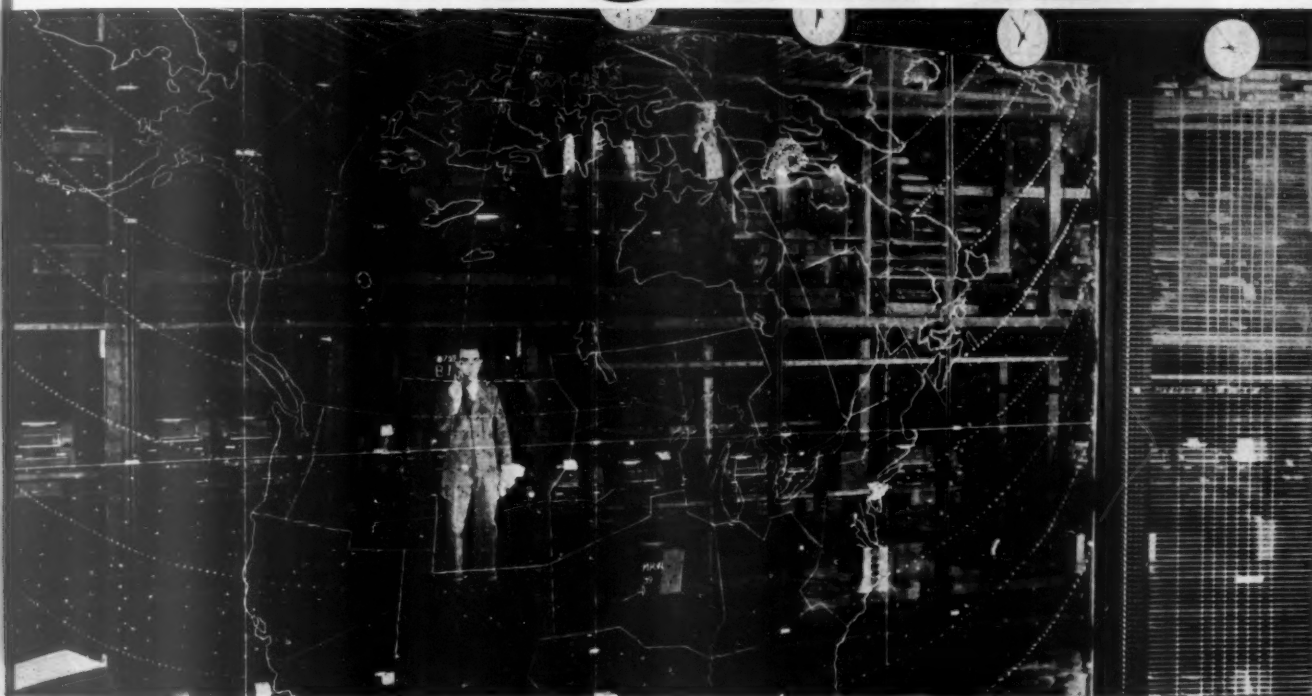
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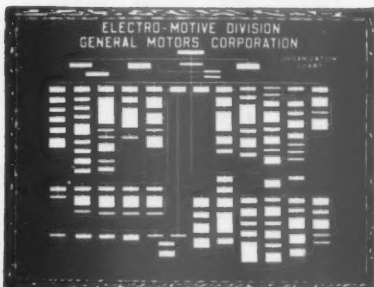


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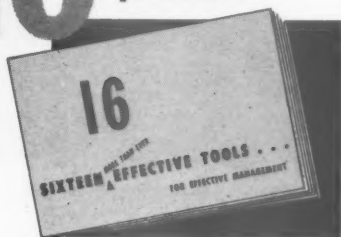


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## In My Opinion

### Military R&D

The article ("Military R&D—How to Make it More Effective" in October issue) was very noteworthy and timely in that it calls to the attention of both managers and technical specialists, particularly at a time when there are so many crash programs, that there must be full cooperation by both parties concerned if success is to be achieved expeditiously.

Tons of paper in the form of directives, organization charts, rules and regulations cannot achieve what can be accomplished by a true understanding and appreciation of one another's problems by top level managers and the scientists who are mutually responsible for the success of the program.

Paul D. Foote

Assistant Secretary of Defense (ret.)  
Research and Engineering

### Miscalculation

Your editorial on "Where ADPS Fits in the Army Future" in the September 1958 issue states on page 9 that the Army controls over one million items of supply and that its inventory is valued in excess of \$20 million.

No doubt the inventory is valued in excess of \$20 million; however a quick calculation reveals that the figure quoted should probably be \$20 billion.

Walter F. Mannerberg

Accountant  
Tinker AFB, Oklahoma

"There's many a slip 'twixt the cup and the lip. . ." You are so right—Ed.

### Bouquet

Needless to say, I was delighted with the comment made about Burroughs in Bill Borklund's editorial, "Why the Rift in EDP Development."

I say this because it is our firm policy, in respect of our relations with the armed services, to do exactly what was suggested, namely, to provide a specific answer to military needs.

Ray Eppert

President  
Burroughs Corp.

### Contradiction

The cartoon on page 13 (of the September issue) contradicts the article. It is the responsibility of the "Operating Force" officials (and not the "Shore Establishment") to determine the things depicted in the picture.

Jack H. Wright

Data Processing Systems Division

### Appreciation

I have just received my copy of the September issue of ARMED FORCES MANAGEMENT and want to say that I am more than pleased with the article Fred Hamlin wrote on me for the Pentagon Profile. I am flattered to receive this attention and thank you for an honor nicely done.

Rear Adm. John E. Clark

Deputy Director  
Advanced Research Projects Agency

### Delegate Reprinted

The National Security Agency (will) reproduce a small number of copies of the article "Delegate—Don't Deputize" which appears in the February 1958 issue of ARMED FORCES MANAGEMENT. The reprints, which will be distributed to a select number of management development trainees, will be used for training purposes.

Shelby Patterson

Director of Training  
National Security Agency  
Fort George G. Meade, Md.

### Shades of Rhetoric

I just finished reading "Problems in Technical Publication Management" in July ARMED FORCES MANAGEMENT. The author, R. Ward, indeed has a problem.

I counted sentences of 70, 47, 48, 34 and 38 words, among others. The author of this article is a technical publication management consultant, yet uses sentences of this weight. And he isn't even involved in a technical publication at this point.

Furthermore, in the 70-word sentence, there were 17 words of 3 syllables or more. Shades of Rudolph Flesch!

Although I agree with almost everything Mr. Ward says in his article, I cannot say anything for the way in which it is written. Make it SIMPLE, make it SIMPLE, make it SIMPLE. Use root words. Keep the syllable count down. Keep the words per sentence down. Keep the sentences per paragraph down. DON'T use topic sentences. DON'T divide into paragraphs on the basis of topic changes alone. Use topography to help readability. In short . . . make it SIMPLE.

Some day, industry will be sold on hiring writers to write technical publications instead of scientists. Maybe then a writer will write an article on problems in technical publication management.

Philip C. Russell

Chief Journalist, USN  
Public Information Office  
Commander First Fleet

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NOVEMBER 1958

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# "I am Very Naive and Optimistic"\*

**F**IREBALL Dr. T. Keith Glennan, director of the newly created National Aeronautics and Space Administration, is probably no student of the Roman General Romulus—and probably couldn't care less. But, Romulus made one statement in his lifetime which Glennan had best heed before he scrambles the nation's space programs completely. The statement: "Let us make haste slowly."

What is wrong with transferring to NASA control of Army's Redstone Arsenal, over half the ABMA's 3900 employees, the Army-supported Caltech Jet Propulsion Laboratory in Los Angeles, and "various other installations?" Apparently not much, if you evaluate Eisenhower's apparent lack of concern over Glennan's bullish moves.

Nor can much hope be held out for Maj. Gen. John Medaris, head of the Army Ballistic Missile Agency, in his frantic attempts to halt this attack from such an unexpected source. After a hurried trip to Washington to stave off NASA's frontal attack, he was refused an audience with the President. Army Secretary Wilber Brucker was treated little better. Asking Defense Secretary McElroy and Deputy Quarles for help, he was shuttled to White House Scientific Advisor Dr. James Killian, talked to a pleasantly nodding countenance, drew a blank.

Could it be that Eisenhower has become so duped by over-emphasized, over-exaggerated and, in most cases, highly erroneous ballyhoo about "interservice rivalry," so fearful of being charged with giving especial aid to his former Service branch, that he is willing to destroy one of the world's best scientific-military research teams? Have our nation's leaders become so sensitive to criticism, so enamored with past praise they will now go to any lengths to avoid adverse comment?

We would remind the men responsible for allowing this travesty to continue that the easiest way to avoid criticism is to make a profession of doing nothing.

What will the U.S. sacrifice to create this new empire?

For one, less than 10% of ABMA's effort and money is used on space problems. The other 90% goes into military nonspace projects and NASA cannot make military decisions. Thus, the Army will have a significant part of its R&D potential—particularly in the missile field—destroyed, have nowhere to turn for help. (Navy and Air Force aid cannot possibly be large. They have plenty of R&D problems of their own to solve, most of which have no corollary in Army battlefield requirements.)

For another, a closely knit, dedicated ABMA team will break up, scatter to private industry (to pick up two or three times their present salaries)—because the team members are almost unanimously opposed to the idea.

Furthermore, allowing NASA to be an operating agency as well as a control group adds one more name to the thick undergrowth of "check-for-approval" Washington agencies, further dissipates authority and makes a hard, concerted drive for success even less easy to attain. How can the men who crusaded for a centralized control of Military R&D during the Pentagon reorganization debate justify this NASA move in the same breath?

A corollary to this: the group momentum of a finely coordinated staff, comprising such top space scientists as Wernher von Braun and Ernst Stuhlinger, will die (as it does when there is any major reorganization), even if NASA manages, by some miracle, to hold the group together. New relationships are created, new authorities set up, new command lines created. How long does it take to rebuild this momentum? ABMA, itself, is a case in point.

ABMA was ordered set up in 1955, but Army actually began assembling its present 2100 scientists and technicians as early as 1945. The team, under another name, started Redstone project in 1950, needed three years work before the first launching.

What has momentum to do with this? Largely because of the formal and informal channels of communication this team built during the Redstone effort, it had little trouble utilizing experience completely, needed less than a year and a half to build a successful Jupiter—although the scientific problems per se were vastly more complicated.

Medaris said recently that the Army's anxiety "does not have anything to do with wanting to take credit for accomplishments," even though its highlights already include a reliable IRBM, the nation's first space satellite. Their real argument: why fire the coach when the team is on an eight-year winning streak?

Said Army Chief of R&D Lt. Gen. Arthur Trudeau, "I just can't believe that anybody would take the capability of the most capable element in the nation to explore space and do away with it. It just seems to me that the national problems are greater than any prejudice that might exist between the services or civilian competition."

If successful, Glennan will have managed with almost ridiculous ease not only to cripple a large chunk of our defense effort but also to deliver our space program to the nation stillborn.

\*To quote Dr. T. Keith Glennan on his first day in office.

Bill Borklund





# Mission, Mobility, And Metal Plates In the 101st Airborne

by Lt. Col. Leo F. Gaffney

**T**HE U.S. Army's Strategic Army Corps (STRAC) practices a concept of operations which calls for "skilled, tough, and ready around the clock" units capable of responding to emergency contingencies world-wide any hour of the day or night. Such a concept demands that Corps administration be geared to the same speed and urgencies as the missions.

The 101st Airborne Division, stationed at Fort Campbell, Ky., is the spearhead of this highly movable, air transportable ground force. And 101st pioneering in alert procedures has brought a major goal of their Commander-in-Chief one step nearer realization.

Said President Eisenhower in his State of the Union message on Jan. 9:

"We must maintain all necessary types of mobile forces to deal with local conflicts should there be need. This means further improvement in equipment, mobility, tactics and firepower."

Maj. Gen. W. C. Westmoreland, 101st-Fort Campbell commander, (at the annual meeting of the Association of the U.S. Army in Washington, D.C., on Oct. 21) spoke of this capability in describing the task force which was dispatched to Puerto Rico for possible use in Caracas, Venezuela, when Vice President Nixon toured that area last Spring.

"You are probably familiar with our experience in May of this year," General Westmoreland said, "when an element of the 101st was called upon to be prepared to go to the aid of Vice President Nixon in Venezuela. We were directed to provide a task force of two companies for departure immediately to Puerto Rico where further instructions would be received."

At approximately 2 p.m. May 13, General Westmoreland received an alert order from Headquarters, Continental Army Command (CONARC). Two and one-half hours later, at 4:30 p.m., the first plane, a C-130 "Hercules" from Sewart Air Force Base, Tenn., was loaded with troops and equipment, and headed for the runway.

Less than eight and one-half hours after the initial alert, at 10:25 p.m., this lead plane of the 314th Troop Carrier Wing touched down at Ramey Air Force Base, P.R. By daybreak the task force was closed into Ramey—1600 miles from its home station.

"This Task Force of the 1st Airborne Battle Group, 506th Infantry, consisted of 560 men, a full complement of weapons, 59 vehicles, 1 helicopter, a basic load of ammunition, four days of rations and all the necessary equipment including parachutes to permit the force to make an airborne assault if required.

"As a matter of interest," General Westmoreland added, "after 24 hours of training in Puerto Rico, the Task Force departed and, following a six-hour flight, returned to Fort Campbell by parachute. This performance typifies the speed of reaction with which the division can move when provided with the essential tools for the job."

Most significant, the General declared, is the continued excellent support and cooperation of the Troop Carrier Wings of the Tactical Air Command and the Military Air Transport Command.

"Prior to May of this year our plans called for the lead elements of the division to move out in six hours following an alert," General Westmoreland said. "On the occasion of the Puerto Rican exercise our first troops moved out in less than half of the required time. Thus you can see we priced ourselves into a higher market and, therefore, have now prepared ourselves to move out at any time within two hours following the word 'GO.'"

"How is this rapid movement possible? Basically, it is possible because one battle group reinforced is designated at all times as the division alert force. Their training and administration is so programmed that they are always immediately available."

Part of the administrative requirements which are sustained at the optimum degree at all times include the essentials of Preparation for Overseas Replacement (POR) required by Army regulations and public law. This is accomplished by continuing records checks and the preparation of standby personal affairs documents which need little more than a signature to set the individual soldier up for deployment.

Several innovations have been introduced by the 101st to assure this readiness and to simplify the preparation and maintenance of records. Noteworthy among these is the preparation of troop rosters and equipment manifests by Addressograph equipment. (Same equipment is used to write many other personnel records, will prepare pay

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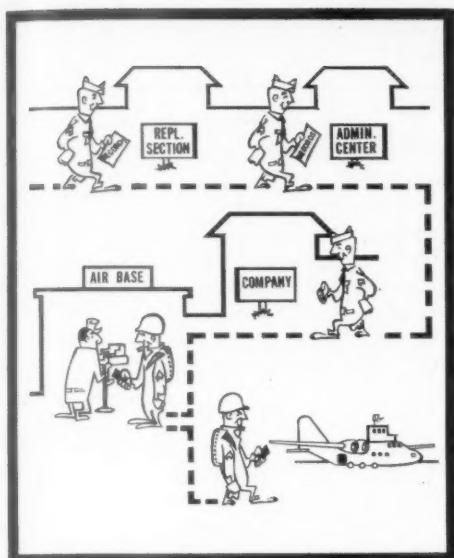


Diagram (left) shows way in which plates are issued to 101st troops, and where data is entered. At right, stamping machine is shown. Note plates in box at rear of truck tailgate.



records and supporting documents when the Army's new pay voucher system goes into effect in January.)

When an individual paratrooper reports into the 101st Airborne Division Replacement Section, an individual Addressograph plate is cut for him by an electric graphotype machine.

Within the next 72 hours this paratrooper is assigned to a battle group or other divisional unit where he reports to the administration center. Here he surrenders his records and Addressograph plate. Thereafter this plate is maintained and kept posted on a daily basis with the unit morning report so that on the day the individual is alerted for deployment, the plate reflects his up-to-date status.

Upon arrival at the departure airfield, and when the type of aircraft and plane loads are ascertained, the composition of individual "chalks" is determined.

(The Air Force-Airborne term "chalk" stems from the fact that each aircraft waiting to be loaded is numbered with white chalk. Throughout the operation the plane and its load of cargo or personnel are referred to by this "chalk number." Hence a "chalk" is one plane load of individuals, the size and composition of which varies with the payload and mission of the aircraft.)

Immediately prior to emplaning, troops not driving vehicles nor guarding sensitive equipment pass in file in chalk sequence by the manifesting point where an operator is located with an Addressograph printer. This printer is manually operated and an assistant operator is provided to receive individual Addressograph plates from the paratroopers as they pass this point practically on the double.

By this system the assistant operator collects the plates for a plane load and loads them in to the back of the printer as quickly as the men file past. The Jumpmaster (paratrooper officer or noncommissioned officer in charge of the chalk load) bringing up the rear of the chalk, remains at the manifesting point until the manifests are printed. He receives the manifests for distribution to the Air Force personnel requiring them and retrieves his chalk's individual plates from the Addressograph operator.

Providing re-manifesting of troops at another airfield en route is indicated, the plates are redistributed to the troops in the aircraft. These plates are inserted in the individuals first aid pouch and will serve as a self-writing

medium for subsequent manifesting at interim airfields where required, or for re-manifesting in assault aircraft in a terminus area if the initial move was by strategic aircraft.

Whereas it took more than two hours to type an aircraft manifest for a company size unit in the past, it is now done more accurately by this equipment in less than four minutes! The preparation of these manifests is no longer a bottleneck in the readiness chain.

The efficiency and flexibility of this system were graphically demonstrated last July when the Crisis arose in the Middle East. At that time the division's 2nd Airborne Battle Group, 187th Infantry, was at Eglin Air Force Base, Fla., on an air mobility exercise—one of several to train the division in the techniques of loading and other strategic airlift procedures necessary to keep a STRAC unit in a constant state of alert.

With the airlift of paratroopers from Germany to Lebanon, the C-124 Globemasters which had carried the 187th to Florida were sent to the Mid-East and the unit was left stranded at Eglin with no return transportation.

A hurried call from the Air Force to the Navy produced enough airlift to return the troopers. And although the airlift included different types of aircraft with varying payloads, the 1060 men, their combat equipment and 185 vehicles were flown the 1100 miles to their home base at Fort Campbell without a hitch.

When a plane would come in to Eglin to land, the 187th operations officer would determine its payload, count off the number of men needed and send them past the Addressograph operator. By the time the pilot had filed his flight plan with Base Operations, the paratroopers and their gear were loaded and ready to go.

General Westmoreland in his address to the Army Association summed up the capabilities of his division:

"Each officer and trooper is keenly aware of the mission of the division which has been succinctly defined to them as 'To be prepared to move any time, anywhere, and fight.' The 'Screaming Eagles' stand ready as the vanguard of STRAC.

"We consider ourselves 'Freedom's Fire Brigade.' We are ready and if you don't believe me, come to Ft. Campbell and see."



## Washington Background

**TO THWART DEMANDS FOR CUTS IN NUMBER OF ACTIVE-DUTY COLONELS AND NAVY CAPTAINS**, services are planning a strong sales pitch at next session of Congress. Main arguments: joint staffs of major world-wide commands set up under defense reorganization and large numbers of military missions to foreign countries have created demand for more such officers. If they pull it off, Services may be able to ease bitter officer gripes (particularly in Army) about pass-overs and lengthy in-grade service currently required. Added note: Navy says only way they can avoid complete morale disaster in officer ranks is "hump" legislation. Without Congress' help, look for virtual "freeze" in Navy ranks for some time to come.

**SERVICES ARE PREPARING ARGUMENTS, TOO, TO BACK UP WEAPONS SYSTEMS CONCEPT**, anticipating reported investigations by both House and Senate Armed Services committees. Because it is so new, idea is still clouded with misinformation, misunderstanding. Military fear is concept—one of best management techniques Defense has devised—may be crippled if they do poor job of educating Congress (whose rules, more than any other factor, hamper continuing improvement of military business operations.)

**MORE THAN 40 MILITARY INSTALLATIONS WILL BE USING AUTOMATIC DATA PROCESSING** equipment to improve supply management by the end of fiscal '59. Total item transmission and processing time is expected to drop an average of four to 20 days as a result.

**NEWEST AIR FORCE MAKE OR BUY POLICY** is being circulated through the Pentagon. End result will be a new regulation which the procurement and production directorate will try to implement.

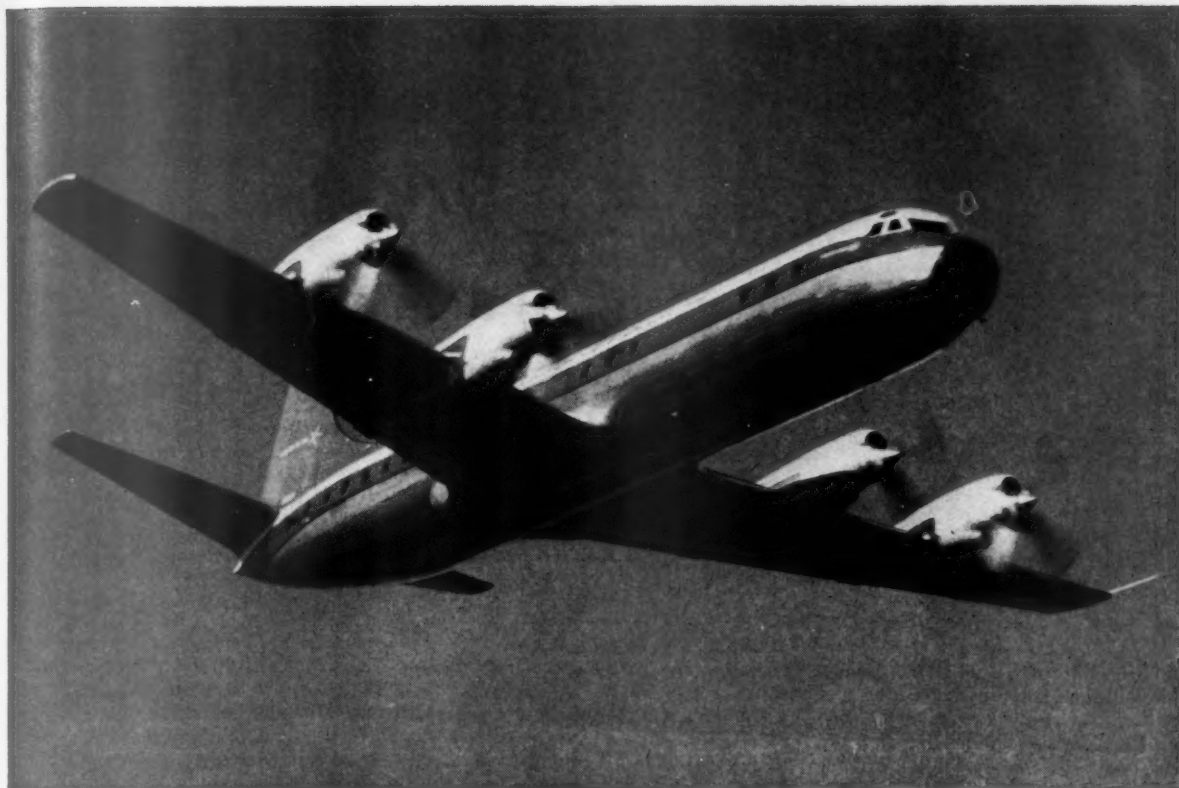
**AIR FORCE IS NOT HAPPY WITH ITS SYSTEM FOR ELIMINATING SUBSTANDARD OFFICERS.** In a letter to major commands, AF DCS for Personnel, Lt. Gen. Emmett O'Donnell, Jr., said high retention rate (35% from Feb. through July this year) of officers up for "show cause" elimination action "is inconsistent with Air Force objectives to bolster the quality of our officer corps." Look for system to change if retention percentage stays high.

**MOVE OF NATIONAL AERONAUTICS AND SPACE ADMINISTRATION TO TAKE OVER** Army's Redstone science team, besides upsetting Army, is also being viewed with apprehension in Air Force circles. Said one AF scientist: "If NASA succeeds in hi-jacking Army Ballistic Missile men with knowledge of propulsion and guidance, what's to prevent going after AF scientists who have done even more work in space vehicle configuration, space medicine?" Rumor also has it NASA will take over Navy high altitude studies and Navy contracts to Universities.

**NASA MOVE ALSO WILL PROBABLY DELAY FURTHER SELECTION OF** Director for Defense Research and Engineering secretariat. Uncertain relations between Advanced Research Projects Agency, Guided Missiles office and R&E has been chief stumbling block to finding right man. NASA move clouds situation further. In the meantime, formal reorganization of R&E sits and waits for new director to approve.

**LOOK FOR MILITARY TO BEGIN GIVING INDUSTRY MORE DECISION-MAKING** authority, simplify change orders in development of new weapons. Statements that present new systems are "too sophisticated," lead times from idea to finished product are too long have been heard from as high up as Joint Chiefs Chairman Gen. Nathan Twining. Said Army Chief of R&D Lt. Gen. Trudeau, "We need more boldness, delegation of authority to take more risks if we are going to save time."





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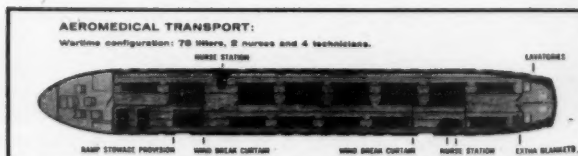
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# Why Navy's Missile Range Is Ready to Grow

by  
Arthur Menken

Pt. Mugu's Aerodynamics Test Facility provides speeds to Mach 3 for both force and pressure tests on models and missile components. It is operated by University of Southern California.

**T**HE PACIFIC Missile Range, established under the Bureau of Aeronautics, vastly increases the test area for American guided missiles and space vehicles. The range is available to Navy, Army, Air Force and civil projects, offers potential instrumentation and safety unavailable anywhere else in the continental United States. This unit ranks with Cape Canaveral and White Sands as a national range.

Says Rear Admiral J. P. Monroe, first Commander of the new range: "In equipping and operating the range, Navy will provide a high capacity, flexible, operationally integrated facility where guided missiles can be launched and their behavior observed—either to determine the missile's performance as a part of development work, or to provide training for missile launching

crews of the Army and Air Force as well as the Navy.

"When completed the range will provide ample room and adequate instrumentation for ground and flight testing of guided missiles of any type—short, intermediate, or long range; ballistic or nonballistic; air-launched, surface or ship launched, or underwater-launched. Facilities of the range will include launching pads, tracking and data-recording equipment, test communications network, instrumentation ships, airstrips, support aircraft, machine shops, laboratories, storage facilities, and other items.

"The nucleus of this new range is the existing Naval Air Missile Test Center, a \$70-million, 5,000-man guided-missile testing center. As an adjunct to Point Mugu, instrumenta-

tion and missile launching sites and facilities will be established at Point Arguello, 90 miles northwest of Point Mugu. The Naval Missile Facility Point Arguello will support both IRBM and ICBM launchings. From this virtually uninhabited location the range can be used by the three services for launchings of all types of missiles."

The management problems involved in staffing, equipping, and administering the new range present manifold tasks to the staff at Point Mugu, both civilian and military.

There are, under the Commander, PMR, four deputies, for Army, Navy, Air Force, and NASA. In the direct command chain are Directorates for Tests, Range Operations, and Support. This division of duties provides effective work flow for enlarged activities.



Technicians monitor operations of Pt. Mugu's Raytheon Digital Analog Computer, used to break down missile test data.



Regulus II is launched as another waits. The Regulus has undergone

ARMED FORCES MANAGEMENT

At present, the organization chart is still developing—the pattern will be adjusted as new requirements evolve. At one location there may be only one radar, while another radar outpost may occupy an entire island. Bases may be temporary or permanent, fixed or mobile. The mobile range concept, as shown in mobile electronic vans developed at Point Mugu, offers the necessary high versatility in missile testing.

Logistic support for the many range sites requires an expanded supply system. This applies particularly to electronic gear. Starting with Point Mugu, Headquarters buildings must be built, adapted and reallocated to give adequate housing to existing and future activities. Antiquated structures—temporary wartime offices and shops—must be surveyed.

An entire new communications network is designed to monitor both inland and oceanic range areas. Regional radar and frequency interference control gear are planned for many activities.

Much new equipment is needed. To service range needs with speed and efficiency, we are modernizing the Center's supply system with automatic and electronic data processing systems. The multiple advantages in EDPS are vital to efficient supply functions over extensive operational areas. IBM cards for all inventory items, plus similar cards as a catalog of available material, make it possible to process a distant requestor's needs swiftly. When an item is not available at the Center or any other range facility, it can be ordered with minimum delay.

Obsolescence and breakdown rates, as well as maintenance periods, can be precisely determined. Complex inventory, accounting and reporting jobs are reduced from weeks to hours.

Future needs are predicted accurately, without bias or guesswork. Big economies result from replacing expendable articles subject to shelf deterioration, based on known average lead times caused by bid procedures, manufacture, and delivery.

EDP performs equally well in personnel administration, and will become doubly useful as personnel expand from 5,000 to 10,000.

Many operations phases confront management on an increasing scale. Security, traffic, industrial safety, and transportation are of problems particularly affecting NAMTC, Point Mugu, and NMF, Point Arguello.

For the missile programs themselves, relations with customers—Army, Navy, Air Force, NASA and others—call for close cooperation and efficient servicing for all their manifold needs. In actual flight operations and tests, new range clearance and range safety criteria will be established and coordinated for maximum range use. Both sea and air traffic lanes must be considered in this area.

Smooth operations in any large establishment call for committees to confer and advise the command on matters including housing, employee relations, traffic. Numerous boards study matters connected with overall technical problems.

Other activities of an external character are interlaboratory groups which exchange information, equipment and materials, on a regional basis.

Since the range covers a large geographic area, liaison must be maintained with several naval districts, CINCPAC, and other entities within the Department of Defense, as well as Coast Guard, Department of Interior, Atomic Energy Commission, and many others.

Inevitably, our organization must

participate in many conferences on various phases of the art, and organize meetings and symposia at the Center.

As range and Center technical activities extend their scope, technical reporting, photographic recording and other data services will keep pace.

The growing routine reporting of administrative matters requires much attention from managerial staff. An even greater work-load results from estimates and plans for continued expansion.

In line with experience at other ranges, continuing interest of press and public demand amplified public information service. While centralized control is exercised by the Center at Point Mugu, available field staff at key points in both United States and overseas bases is an obvious necessity.

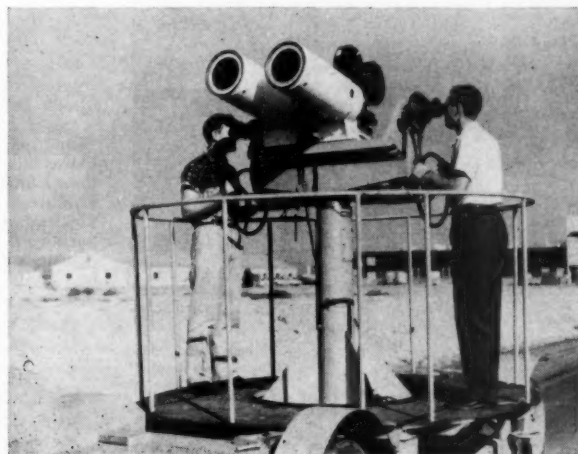
One pitfall to be avoided is the subtle, but constantly increasing use of time of scientific personnel for administrative matters. Recent studies show that this has progressed too far already, and capable managers must be added to the staff if scientists are to make their vital program contributions.

Provision of scientific information and equipment by the Range Instrumentation, Laboratory Evaluation and Technical Service Departments is essential work at the new range. These departments, geared to service the many projects under test, produce the scientific data that form the end test product.

All foregoing problems are similar to those confronted by any multi-million dollar business in a large expansion. Personnel, plant, and materials can be related to the tasks assigned and kept within budgetary limits. It is managements' task to make the Pacific Missile Range a truly vital element in our national defense effort.



many tests at Pt. Mugu. Plane in background will follow the missile in its flight, both for observation and safety.



Stability and mobility are combined in this mobile Optical Tracking Unit, used on Pt. Mugu's inland missile range.





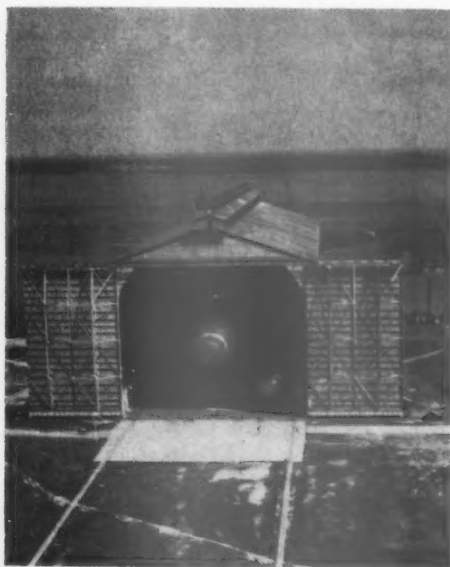
Langley AFB, Va. in 1934 was notable for lack of runways, overall simplicity.

## Can AF Bases Stay in Step?

by Fred Hamlin

*In the face of mounting complexity, the Air Force Directorate of Installation Engineers finds its job becoming harder and harder every day. In managing "all the real estate the Air Force owns," this Directorate has its hands full.*

*The problem is to do a \$4-billion job with \$1.2 billion in funds—and at the same time to keep up with tremendous demands on the bases they service. This is how AFOIE solves the problem . . .*



From balloons to ballistic missiles has been long haul for Installation Engineers. Growing complexity is shown by comparing 1927 balloon hangar with modern Atlas ICBM launch facility.



**"THE LOCATION** for Hamilton AFB, Calif. was picked for its strategic location. The site is equally distant from the borders of Canada and Mexico." So wrote some far-sighted soul in 1932, for the Hamilton base history.

Now an Air Defense Command base, Hamilton has multiplied its original runway lengths by four. The 1932 strip, 2000 ft. long, has given way to an 8000 ft. reinforced concrete runway, capable of handling the multi-sonic aircraft currently flown by ADC. These planes reach beyond the borders of Canada and Mexico, and be-

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yond Canada and Mexico themselves, defending the entire world-wide Air Force establishment.

Langley AFB, Headquarters for the Tactical Air Command, is another case in point—when founded in 1916, it was described as a "turfed area." Presently, Langley has a paved runway area of over two and a half million square feet. Originally purchased for \$290,000, Langley has a current estimated worth of roughly \$46 million. To call this change and growth spectacular is to understate the situation.

Handling this growth and change, at Hamilton, Langley and throughout the Air Force are the Air Force Installation Engineers. The Director of Installations (AFOIE), Maj. Gen. A. M. Minton in the Pentagon supervises Installation Engineer activities where ever USAF personnel are located. The installation engineer's job ("service more than anything else—we fill others' requirements.") is an essential element of the Air Force mission. If Strategic Air Command planes have no bases to fly away from, they are useless. On the organization chart, Directorate of Installations fits under the D/CS for Operations, but their work reflects on all 15 AF Commands.

As recently as 1950, the Air Force Base was a fairly simple operation. Refuelling was handled by tank trucks, and runways had only to accommodate propeller driven aircraft. Heating was handled by individual units, and communications facilities were a far cry from today's ultra-complex systems. Air-conditioning was a seldom found luxury.

Just in these few points, the progress in the last few years is amazing. Heavy jet bombers must take off and land on long, rugged runways, refuelling is done with high-speed individual hydrant systems, electrical power grid systems must be built into air base pavements, and communications have become almost unbelievably complex. Air-conditioning has become a necessity with many heat-generating electronic systems. Actual building damage has resulted from jet noise in some cases. Base-hardening, industrial waste disposal and nuclear weapons storage have created new problems.

By and large, the entire Air Force construction program is run under the supervision of AFOIE. While they do little actual building or contracting, all of this work is done to AFOIE specifications, and under careful AF-OIE surveillance and inspection. Once the construction is complete, management, operations and maintenance falls to the Base Installation Engineer. The BIE is an advisor to the Base Commander on the base physical plant. He must deal with near-base civilian popu-

lations on such matters as electrical power, sewage, water and mutual aid programs such as fire protection and Fire Prevention Week activities. Zoning programs, both on the ground and in the air, are the lot of the Installation Engineer.

Besides these day-to-day operations, the BIE must plan for the future. An up-to-date Base Master Plan (currently running to 1960 and beyond) must be kept up. The BIE must also serve as an office of record for all AF real estate assigned to his base, account for dollars spent on the physical plant, provide recreational and other facilities as needed, and supervise construction and maintenance for the AF-wide Capehart housing program. (AF is eventually slated for 74,000 units). Such vital factors as re-enlistment rates vary directly with base physical plant condition. A well-kept base with top recreation opportunities is a strong re-enlistment incentive.

An important duty of the Base Engineer is to advise the Base Commander on his annual fund requests. For this, the installation engineer serves on the base Installation Planning Board, a group headed by the Base Commander. On this board are representatives from each major base staff activity, and one non-voting member from Headquarters, USAF. Requirements are drawn up and submitted by the Board through channels to HQ., USAF.

At about the same time, the Secretary of Defense hands down the amount of money that Air Force can expect in the coming fiscal year. The two figures meet at AFOIE in the Pentagon.

Last year, the difference between the two figures was marked: Air Force construction requirements were \$4 billion, and OSD allowed a \$1.2 billion budget. The process which follows probably most clearly characterizes the year round job of the installation engineer—boiling down the difference, and making the most of what is on hand. This process is carried out at base level and in the Pentagon, and in both cases is a matter of assigning priorities. In the Pentagon, the boiling down is done with a short deadline—because it is an eight to ten week job, it requires those concerned to work days, nights and weekends.

What is left is what the base engineers have to work with, and they must use it in the face of rising costs and the ever-increasing complexity in their job. Aside from the tremendous Air Force growth as such, there are near-overpowering demands placed on the installation engineer simply by virtue of the complex systems he must work with. A striking example of this is the Atlas ICBM—ten Atlas missiles

at their launch site represent only 20% of the total site cost. While the Minute Man solid propellant missile family will be cheaper to maintain than present liquid-fuel missiles, the possibility of underground launch systems will do much to offset the advantage.

The result of this is an entirely new set of problems for the installation engineer. Because of manpower shortages and increased labor costs at the big missile sites, more and more automation must be used for the operations to run smoothly. In connection with automatic data processing systems, and with the missiles themselves, there are a whole new set of environmental problems—humidity and temperature tolerances alone require extensive air-conditioning and heating equipment at the missile sites.

The outlook for manned aircraft is not much more encouraging from the installation engineer's viewpoint. Manned aircraft in the missile age need just about as many support facilities as the missiles do. The concept of instant retaliation has forced the Air Force to overhaul its bases from top to bottom. While the Air Force has specified that the B-70 chemical bomber will be built to fly from existing facilities, it will unquestionably bring with it a new load of problems when it becomes ready for use.

Developments such as these have caused the Air Force electric bill to double in the past two years, while the civilian electric bill is expected to double only once in each ten years. Inventory since 1950 has rocketed from \$2.5 billion to the present figure of over \$10 billion, and Air Force estimates that this will reach \$15 billion by 1962. In fiscal 1957, unkeep of existing facilities brought home a \$592 million bill, and as the facility inventory climbs, the maintenance bill will continue to keep pace.

Air-conditioning horsepower needs at AF bases, from 1950 to the present, have climbed from 95,000 hp to over 240,000 hp. Heating horsepower needs are even more spectacular in their climb—from a 400,000 hp requirement in 1950, the need has mounted to over 1.8 million hp.

Faced with possible nuclear war, the AF installation engineer must maintain the ability to strike back after atomic attack. Base-hardening is only a start. Provision must be made for fast debris removal from runways and for radioactive decontamination if the SAC bases suffer hits or near-hits. Communications must be maintained—at all costs. AF bases must have their own auxiliary power supply, in addition to the power they draw from local civilian sources. There is the problem of safely storing nuclear weapons.

With increased use of automatic data processing systems, AF installation engineers have found themselves faced with still another problem. If the power source on the mammoth air defense computers fails, and is not immediately repaired (margin is less than one minute on Ballistic Missile Early Warning System), the entire memory of the processing system may be lost. This means that Semi-Automatic Ground Environment (SAGE) system buildings must be virtually self-sustaining. There must be auxiliary power on tap at all times. In the case of Aircraft Control and Warning stations, there are usually three or four power generators installed besides those it takes to run the system.

Another aspect of the Installation Engineering problem is the need to impress Air Force contractors with the job's magnitude, and the tight fund limits. Particularly in the environmental control and automation fields, says one installation engineer, AF must "rely to a great extent on carefully selected contractors. We must be adaptable to change at minimum expense. We have not yet been able to get across to industry the austerity with which we must work."

A striking example of this is occurring in development of the Bomarc Air Defense Missile launch shelters. Original Bomarc Launch-site plans called for an elaborate concrete housing for the missile, and an equally elaborate elevator system for raising the missile to fire it. Through cooperative effort of industry and AFOIE, the original concrete missile housing will likely be replaced by "practically a corrugated iron shed," according to one AFOIE officer. The resulting Air Force savings were well worth the trouble, both on the Bomarc, and in subsequent AF contracting.

It is in this area—research and development—that the installation engineer's work will have growing importance in the future. There are presently about 65 Installation Engineers assigned to the Inglewood, Calif. Ballistic Missile Division of the Air Force. It is their job to keep pace with the developments in ballistic missiles, and to make sure that needed facilities construction will be finished in time to put the big missiles on the job.

In the words of Lt. Col. Walter G. House, Military Assistant to the USAF Director of Installations, "We must go hand-in-hand with weapons system development, since time does not permit us to do our work after the weapon is built. With the Titan missile, in the advanced development stage, the facilities are going along with the missile, and will be ready when the weapon is.

While we have not participated as closely in this aspect of the business in the past, we are getting more and more into the weapon development field."

Included in specifications that BMD engineers must put together for the missiles are launch stands, fuel storage and communications facilities, and equipment/personnel protection requirements.

Equally important from the research and development viewpoint is test facility construction. Unless these are ready on time, it "would very easily hinder the development" of the missiles themselves. In this area, AF installation engineers designed a great part of the Canaveral complex, including down-range stations, and are currently working on test facilities for the Snark missile at Eglin AFB (the IE's are also building operational Snark sites in Presque Isle, Me.). Work on such programs as space probes and Air Force satellite tracking stations are also in the hands of the Air Force Installation engineers.

If the tremendous dollar and development pressures on the installation engineers were not enough, AFOIE is faced with a more-than-acute personnel problem, from the standpoints of both technical skills and numbers. There are presently roughly 1800 AF officers, 37,000 airmen, more than 36,000 U.S. civilians and 23,000 foreign nationals in Installations Engineering, Worldwide. The Air Force requirement for officers in this field is 3500.

A comment by a Pentagon AFOIE officer sums up the personnel situation: "This numbers racket is a rough one. Our biggest single problem is personnel. It is one of quality as well as quantity." Manpower ceilings and lack of qualified personnel—mostly civil, electrical and mechanical engineers—are the big stumbling blocks.

Installation engineer requirements currently call for all officers to have Bachelor of Engineering degrees, and an additional 23% to have some sort of advanced degree, either in engineering or management. At the present time, only 46% of the officers have a Bachelor's degree, and a scant 5% have a Masters or higher degree. This situation results primarily from the heavy draft of officers from non-engineering fields, and from low retention rates in junior grade officers in installation engineering.

AFOIE is working to combat this situation. First, there has been an installation Engineer school formed at Wright-Patterson AFB, sponsored by the Air University. The instruction is broken down into an advanced and a basic course. The basic course, which runs for three months, accommodates

about 250 students in its four yearly classes. The nine-month advanced course takes on a class of 45 officers—about 15 of these from Military Assistance Program nations—and meets once a year.

The basic course aims at officers coming into the Installation Engineering field for the first time—either newly-commissioned officers, or those transferring from other branches of the Air Force. The advanced course is geared to officers who have some prior experience in installation engineering. The course aims to up-date and increase technical skills on the part of its students, and to polish their managerial skills.

In another attempt to increase officer skills, AFOIE has established a quota for study at civilian institutions. Last year, the total quota for this was 23, and this year it is up to 39. Of these, 16 will work on Bachelor's degrees, 22 on Master's, and one officer will work on a PhD. The hope is that this quota will be increased further next year.

As is true with money, here the Installation Engineers are forced to work with what they don't have—they must boil down their requirements, and work with the deficit.

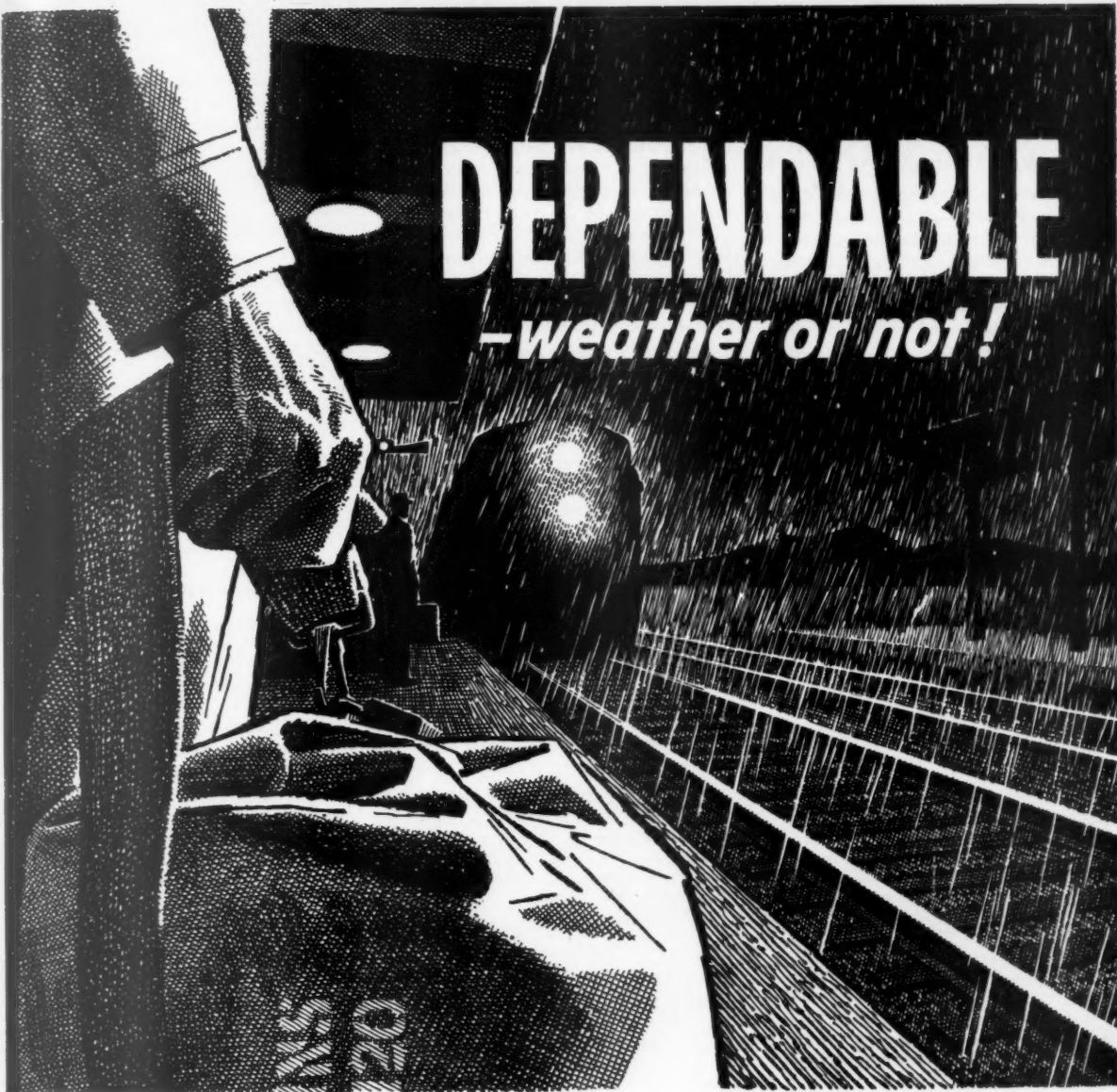
Handling the program of increased officer proficiency for the Installation Engineers is a panel set up by AFOIE Director Maj. Gen. A. M. Minton. The group has five aims. (1) They will implement a 1957 study of AFOIE manpower needs. (2) They will affect necessary coordination with the Directorate of Military Personnel and the Directorate of Manpower and Organization. (3) They will consider and make recommendations on request for waivers of mandatory education and experience qualifications. (4) They will determine the continuing qualitative technical needs for AFOIE officers and officer-type civilians, worldwide, and (5) They will determine and recommend to the Director of Installations new and improved methods of providing increased professional status to the Installation Engineer Occupational Field.

The story of the Air Force Base in the past twenty-five years has been one of change—change as radical as the changes in Air Force strategy, and as rapid as the advances in aircraft-missile research and development. To keep abreast of this progress, building and managing the needed AF ground facilities has been more than a full time job, and in the future this work can only increase. From bakeries to bowling alleys to ballistic missile sites, it is a huge job, but without its being done, the Air Force could not get off the ground.



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### New Space Agency Moves To Take Over Army Work

Despite strong protests by the Army, it appears likely at AFM presstime (Oct. 30) that the newly-formed National Aeronautics and Space Agency will assume control of some 2000 persons employed by Army Ballistic Missile Agency and Jet Propulsion Laboratories.

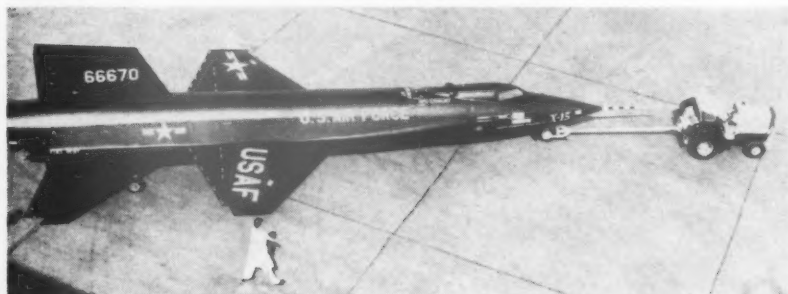
While the National Space Council is still considering the move, chances for the Army to maintain their programs seem slim. According to informed Pentagon sources, President Eisenhower is backing NASA's Administrator, J. Keith Glennan to the hilt.

AFM's informant pointed out that ABMA Commander Maj. Gen. J. B. Medaris flew to Washington immediately after the plan was announced, but was refused an appointment with the President. Other Pentagon sources feel the NASA moves too fantastic to be without high-level support.

Regarding the proposal, Army Chief

of R&D, Lt. Gen. A. G. Trudeau told the Association of the U.S. Army convention that "I just can't believe that anybody would take the capability of the most capable element in the nation to explore space and do away with it. It seems to me that the national problems are greater than any prejudice that might exist between services or civilian competition."

Trudeau further said that "When you talk about transferring people, you aren't just talking about transferring people, you are talking about wrecking the organization. If you consider any agency (which was farsighted enough 13 years ago to get the group of German scientists and go into the missile field earlier than anybody else, and to develop a greater competency and demonstrated capability than anybody else has yet introduced on the American scene) as being out of their field when it's a fight for national survival, and the importance of space exploration is recognized throughout the world, then maybe we are not together on this thing."



First of three X-15s is rolled out. Two others are scheduled for delivery to the Air Force in the first half of next year.

### January Test Planned for X-15

A significant forward step towards putting man in space was taken in the recent roll-out of North American Aviation's X-15 research aircraft. Said to be able to reach over 3600 mph, and over 100 miles in altitude, the research craft is scheduled to fly in February of next year.

Air Force is buying three of the planes in the overall \$120 million program, and will work with National Aeronautics and Space Administration. NASA drew up preliminary specifications for the X-15 in 1954.

To be powered by two XLR 11-5 Reaction Motors liquid rocket engines on its first flight, the X-15 will be piloted by North American test pilot Scott Crossfield. Later models of the plane will be propelled by single XLR

99 engines, which are also built by Reaction. It was the XLR 11-5 which was used in the Bell X-1 in the first breaking of the sound barrier. Fuel will be liquid oxygen and liquid ammonia. Final tests will be flown by Air Force test pilot Capt. Robert White.

Dimensions of the X-15 are: span, 22 ft.; length, 50 ft.; overall height, 13 ft.; maximum gross takeoff weight, 31,275 lbs. The plane's wings have 25° sweepback, 200 sq. ft. of area, and are made with a single-spar box-type construction. The wings will have no movable surfaces.

To withstand tremendous re-entry temperatures, the X-15 will have a heat sink type nose, formed with welded Inconel X, a nickle alloy.

Gen. Medaris suggested that NASA follow the example of ARPA and delegate authority to the Army. "As a matter of personal judgment," he said, "I have never considered it necessary to have everybody I needed on my payroll."

NASA, formed officially on October 1, was originally given \$301 million in operating funds, and jurisdiction over several Advanced Research Project Agency programs, in addition to Navy's Vanguard.

When asked if he felt he would be able to stay clear of military entanglements in his new job, NASA Administrator Glennan said "I am very naive and optimistic, and have no great concern" in this area.

### Army Group to Study Radioactive Fallout

Plotting and predicting radioactive fallout will be the job of the recently formed Army Radiological Control Centers, small teams of specialists formed under Army's Chemical Corps. The groups will also study radiological monitoring and survey data in the combat zone.

The new units will operate at Corps, Field Army and Division levels, and will be composed of one officer and four enlisted men. Prototype RADCs group was formed at the 1957 Desert Rock VII and VIII tests.

### 3-D Radar System Unveiled by Army

Frescanar, a three-dimensional radar system recently unveiled by the Army, reportedly has 20-50% more range than present radars. Frescanar will be used as the tactical counterpart of the Missile Master defense system.

The radar's single antenna can compute range, bearing and altitude. The system also provides better object separation with minimum ground clutter. Frescanar will be used in connection with Nike and Hawk missiles, and perhaps in the future as an electronic countermeasure.

### Air Force Moon Shot Probable This Week

Air Force will probably launch its third and final authorized moon-probe vehicle on or about November 7. This will be the first-time the Moon will be in proper relation to the earth since the October 11 firing, which reached an

ARMED FORCES MANAGEMENT



Air Force Pioneer shortly before record breaking 73,000-mile space probe. Final stage of the space vehicle was an 83.8 lb. instrument package.

altitude of 73,000 miles and proved the feasibility of shooting for the moon.

In last month's experiment, the moon vehicle had an angle of climb which was 3.5 degrees too steep, and so failed to reach the vicinity of the moon. Air Force tried to fire retro rockets in the vehicle, but internal temperatures were too low for Doppler Command gear to function.

## ARDC Carries Out Stever Suggestions

Air Research and Development Command has begun to follow up those recommendations in the Stever Report which are under in-house jurisdiction. Further recommendations in the report are under consideration by the Air Staff.

ARDC Commander Lt. Gen. S. E. Anderson termed the report "superior," and acknowledged the need for it. The major immediate changes effected the AF Ballistic Missile Division and the field of aeromedicine. At BMD, Anderson said that missile work and space work will be organizationally separated, and placed on an equal status. Aeromedicine work has been further centralized by ARDC.

The major recommendation submitted to the Air Staff concerns the AF R&D budget. Gen. Anderson wants to separate contract money from support or housekeeping funds. Advantage of this move would be to let the public know that Air Force does not get more R&D funds than are actually the case, and that it doesn't spend all research money on support functions.

The major criticism in the Stever Report was of growing lack of trust of the men who have program responsi-

bilities. Anderson said this situation results from reprogramming caused by limited funds and tremendous costs. He said that year-long programming would create the necessary authority for corresponding responsibilities.

## Air Force Starts Work On Nuclear Power Plant

In cooperation with Atomic Energy Commission, Air Force has invited bids from industry for design, development, fabrication, installation and test operation of a factory-assembled, modular nuclear power plant.

To be similar to the Army reactor presently operating at Fort Belvoir, Va., the Air Force plant will have a pressurized water reactor, cooled and moderated by light water, and fuelled with enriched uranium. It will generate 1000 kilowatts of electricity and approximately 2000 kilowatts of heat for office, barracks and other buildings.

To be built of all air-transportable components, the project will probably be completed within about 30 months.

## Category Testing Cuts Systems Check-Out Time

New flight-test techniques—called Category Testing—have been initiated by Air Research and Development Command with an eye to reduced check-out time on new Air Force equipment. The new system will replace piecemeal equipment testing under the former phase method.

The new system picks up test operations from the time that a weapon system leaves the drawing board until it is delivered to the Air Force. The three test categories under the new set-up replace a former eight phase cycle. Under the old system all testing was done

after the product was delivered to the Air Force.

The three test categories under the Category Test plan are (1) searching out problems in individual aircraft or missile subsystems and components, (2) checking combined subsystems, and (3) user evaluation in completed system. Components, support items and complete squadron unit skill under operational conditions are included in Category III.

In the first Category are qualification, redesign, refinement and re-evaluation. The second Category includes reliability, durability and compatibility studies.

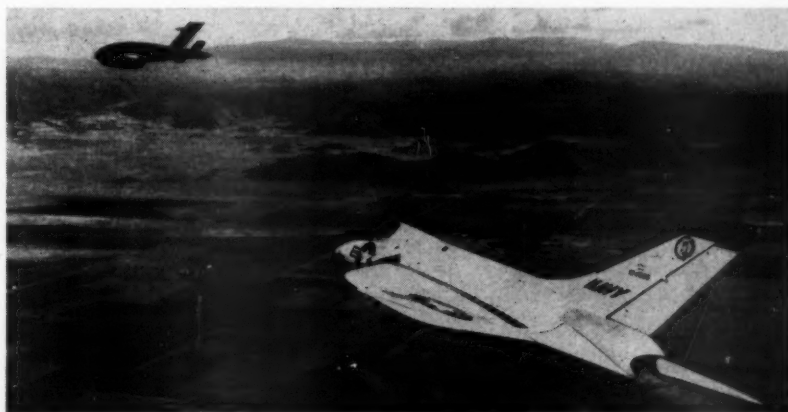
The system was used with the B-58 development program, and will also be applied to testing of the F-108 and B-70. The new test techniques eliminate costly delays caused by minor parts failures during first test flights.

## Aluminum Troop Carriers Are Air-Transportable

An air-transportable, aluminum bodied 13-man armored personnel carrier is presently being introduced to operating Army units. First of the T-113 troop carriers will be flown from manufacturer to operating unit in Military Air Transport Service aircraft.

The carriers provide troops with protection equivalent to that of comparable steel armor, with a considerable reduction in weight, and can mount either a .30-caliber or .50 caliber machine gun. They are also said to produce better power/performance ratios than the older models.

The T-113 can also be used as a self-propelled weapons carrier, a rocket launcher carrier, a mortar carrier, an anti-tank missile carrier, an ambulance, a fire direction center, a communications vehicle or a command post vehicle.



Fully recoverable Ryan Firebee target drone which was used at recent Air Force Weapons meet at Nellis AFB, Nevada. It was the first time that a free-flight target drone has been used at an Air Force Weapons Meet.



## Industry Developments

### Space Communication Needed, Says Official

New advances in space communications are needed to keep pace with the present progress of space science, according to L. Eugene Root, vice president of Lockheed Missile Systems Division. Root spoke to the National Symposium on Telemetry in Miami Beach, Fla.

Root noted the short life of the communication systems of present satellites as contrasted to total time in space of such vehicles makes it vital to emphasize research in the telemetry effort. Rapid space science advances, he said, "is expected to have repercussions on the whole field of telemetry and also to change appreciably the nature of the job which this equipment is required to do."

### Ballistic Cargo Missile Developed by Convair

"Lobber," a ballistic missile system for delivering supplies on a tactical level, has been developed for the Army by Convair Division of General Dynamics Corp. The missile can deliver rations, ammunition, medicines or communications equipment to forward, isolated positions.

Lobber can be handled by three men, and at least 70% of the missile is recoverable. Convair officials also pointed out that the small missile could

Solid fuel rockets, said Root, will need even greater degrees of miniaturization than present models, due to stricter weight requirements.

For the future, Root said "It is difficult to set any limit . . . since the space enthusiasts already talking about lunar and interplanetary flight and even more modest workers in the field of artificial satellites can see the need for ranges up to about 22,000 miles."

### GE Defense Executive Calls R&D Big Business

A \$10-million dollar budget for industry in 1959, coupled with the risk involved combine to make research and development an "industry" of itself, says C. W. LaPierre, General Electric Co.'s top defense executive.

deliver napalm, explosive and other warheads.

Uses for the missile include monitoring of radioactive areas, rapid buildup of supply depots under cover of darkness or weather, augmenting beach-head mobility and supplying emergency rations to isolated units.

Precedent for Lobber was during World War II when elements of the 1st Army were cut off at Mortagne in 1944, and supplied with food and emergency rations packed in 105-mm. shells and fired over the heads of the enemy.

The Vice President of GE's Electronic, Atomic and Defense Systems Group also said that the capital investment, payrolls, manpower and materials which go in to pure research and development has a pronounced effect on the nation's economy. As an example, the GE official said that R&D expenditures next year would amount to 2.3% of the gross national product next year.

The amount of risk in R&D come from all angles, he said, including economic, political and customer relations. He pointed out that one highly publicized failure in the R&D area could easily destroy a company's reputation. LaPierre said that his firm and others would be more interested in defense research if the profits were comparable to similar profits in civilian R&D.

To eliminate some of these high risks, he said, we must subject our R&D system to even greater critical analysis. By taking such steps as "cutting the red tape of restrictive practices and prevention-of-mistake machinery we can help ensure optimum use of our vast technological and scientific resources."

### Small Vulcan Fires 7.62 NATO Rounds

General Electric Co.'s Missile and Ordnance Systems Div. has announced development of a cut-down version of the 20-mm. Vulcan cannon. The new weapon is said to fire the standard 7.62-mm. NATO shell at a rate of 6-10,000 rounds per minute.

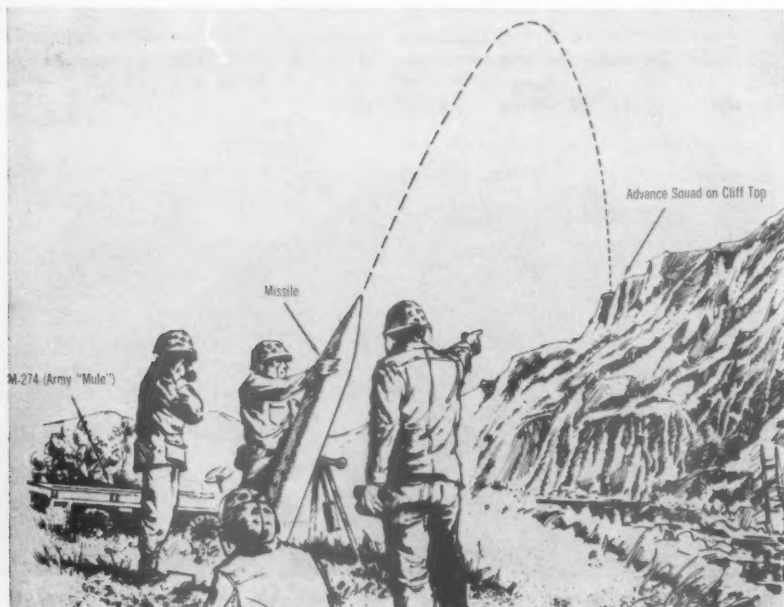
The weapon has eight barrels, firing on the revolving Gatling gun system. The smaller gun has a linkless ammunition feed system, like its larger counterpart, which is used on B-58 and F-105 aircraft.

The small Vulcan is designed for use with light, fast aircraft. The barrels are rotated with either electric or hydraulic power.

### Burroughs Announces High-Speed Printer

A new ultra-high speed page printer, capable of printing 3,000 words per minute, was shown at the Association of the U.S. Army convention in Washington, D.C. last month. The machine prints 48 times faster than the teletypewriters currently in use.

The electronic teleprinter can be used for news stories, military communications, scientific data and other urgent information. It was developed by Burroughs in cooperation with the U.S. Army Signal Corps.



Logistic support to front line isolated troops can be supplied by Convair's "Lobber." The ballistic missile can be handled by 3 men.

# What Price Procurement Integration?

by Ernest F. Leathem  
Assistant to the President  
Raytheon Manufacturing Co.



*While a dynamic improvement is occurring in military procurement organization, the rules they use in dealing with industry are collecting dust. Here is why the rules need changing—now.*

WE live in an age of growing complexity—not merely in the areas of human relations, diplomacy and world affairs, but also in the inventions provided for our comfort and protection. Indeed, military weapons and weapons systems are now becoming so intricate and so large, and are reaching into so many different industrial skills simultaneously, that one Service—the Air Force—is actively soliciting “team bids.” This is not merely a move to bring small business more into a prime contract relationship with the Armed Services. Some of the largest corporations in America are joining on single “teams.”

What capacities must an industrial organization have when it commits itself to be responsible for a complex weapons system, either as the sole prime contractor or as a member of a “team”? What attributes and skills are the Armed Services seeking when they choose a corporation or group of corporations to undertake such a commitment?

Does each party to the resulting contract know what it is selling—or buying? Are the values of this being properly assessed in fixing contract terms, allowing and allocating costs, or setting rates of profit return? These questions lie at the heart of the new technical and contractual patterns of relationships which must evolve if these new weapons systems are to be produced promptly and efficiently, and with the maximum incentives under the profit-motivated free enterprise system.

The prime contractor or team leader must have technical

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Assistant to Raytheon President Charles F. Adams since 1947, author Leathem was once a practicing New York Lawyer, has given talks on procurement policy and procedures at both the Industrial College of the Armed Forces and the Army Supply Management School. A World War II Navy commander (whose duty was to assist the Technical Bureau in handling their procurement problems), he is also a member (since 1950) of the National Security Industrial Association's Procurement Advisory Committee.

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competence in depth, and in such widely varied fields as aeronautics, electronics, propulsion, hydraulics, metallurgy, astronautics, chemistry, physics or mechanics—just to name a few. Its personnel must understand, supervise and coordinate research and development activities being carried on simultaneously in many places. Thus scientific administration, appraisal and decision are “products” purchased by the Armed Services, because the Government cannot itself supply the manpower or facilities to perform these functions.

Similarly, the prime contractor or team leader must plan and supervise the acquisition of facilities, test sites and test equipment. It programs procurement and the flow of materials, and expedites the development or production of critical components and materials. It creates and maintains budgets and cash flow requirements, and performs hundreds of other tasks of general leadership and planning. It must sell and keep sold the project as a whole, and be quick to change or adapt it to new knowledge or new requirements. In short, it must perform all of the skills of management and leadership—commanding here, cajoling there, but everywhere keeping the job going.

More and more it is being found and recognized that a corporation which has achieved efficiently within itself a relatively high degree of integration is most apt to be able to fulfill the manifold and complex requirements of prime responsibility for a weapons system. This is because such a company is really only extending the functions it already performs and the techniques it has already learned. It knows at first hand the problems of research, of engineering and development, of type-testing, of production engineering and large-scale production, of installation, of servicing and of training operators. It has a developed ability to plan, to organize, to sell and to finance.

To the extent that such a company can or does perform parts of the designing and production of the weapons system with its own personnel and in its own plants, it accepts production risks in addition to its obligation to manage. Thus the integrated producer is selling two products—management and hardware.

Finally, such a prime contractor or team leader must know how to purchase, to educate and train vendors and suppliers, and to expedite their performance. No matter how integrated it may be, the chances are that the weapons system contractor will procure, directly or indirectly, several hundreds or thousands of parts, materials, components and subassemblies before its job is done. Of course, this is the real place for small business in this kind of defense work, and the Government and industry alike should seek out and encourage their participation. This is a third “product”—procurement leadership and responsibility—which the Armed Services order from their prime contractors or team leaders.

## Profit Paradox

Much more could be said to analyze and break down the functions and responsibilities of the integrated industrial weapons system contractors, but this should be enough to show that what these contractors are selling and what the Armed Services are buying may vary all the way from management alone to complete design, manufacture and fabrication. There are hundreds of gradations between these two extremes.

The reward (or profit) of the contractor, therefore, should be based upon the nature and quantity of these products, or responsibilities, it is undertaking and what each is worth. Unfortunately, this is not the case. Profit allowances are as stratified for such a contractor, depending upon the basic type of contract employed, as they are for supplying a routine replacement of an obsolete

radar or a worn-out tank. Contract clauses are rigidly fixed by Department of Defense and departmental regulations, procedures and instructions which leave little, if any, room for adapting contractual terms to the special needs of the weapons system to be achieved.

Several of the established policies and practices of the Government tend to penalize the very elements of integration which are necessary to enable a contractor to undertake weapons system responsibility. Whether or not these policies were ever right or justified, it is certainly appropriate now to reexamine a few of them and to ask whether their continuance is justified, or their application to a weapons system contractor is equitable.

## Penalties of Subcontracting

Many Government negotiators have long had the concept that the more subcontracting a prime contractor does, the less risk it assumes, and hence the less profit allowance it should receive. This has been applied not only in fixing profits on fixed price types of contracts, but also in setting rates of fees on cost reimbursement contracts. The principle was stated officially in 1948 in Navy Procurement Instructions, and is implicit in Sec. 3-808.5 of the Armed Services Procurement Regulation. Perhaps its most spectacular application was by the Renegotiation Board in its decision in the Boeing Case (now being appealed by that company), in which very large refunds were demanded in renegotiation specifically because of the large volume of subcontracting by Boeing in the year under review.

On the other hand, military contracts must include a clause under which contractors agree to place subcontracts with small business as much as possible. It is the declared policy of Congress, and of each of the Services, that small business should participate as widely as possible in defense contracting. Thus the military's pricing policy is expressly opposite to the Government's procurement policy.

Even more relevant, however, to this subject is the fact that the whole concept of placing weapons systems responsibility in a single company is wholly dependent upon its agreement and willingness to place major subcontracts, and to supervise and coordinate their performance. The Government by this practice is shifting the whole risk from its shoulders to the contractor, and the latter's "contribution" must become greater if it succeeds at all! It is, therefore, wholly inconsistent to penalize the contractor by reducing allowable profit because it performs the very service being purchased.

## Why Not Interdivisional Profits?

Another fetish among Government negotiators is that a contractor should never be allowed "a profit on a profit." In other words, work performed in one profit and loss center of a company should not be transferred to another such center bearing a profit in addition to that earned by the center having primary responsibility for contract performance.

Companies which are integrated and which are large enough to undertake weapons system responsibility will, in almost every case, have established divisions, or geographical units, or both, to which are delegated responsibilities to operate efficiently and at a profit as a unit. Work performed by one of these must earn it a profit, whether it is being delivered to another unit of the same company or to a wholly unaffiliated customer.

Conversely, the buying unit would pay a price (including a profit) to an outside supplier of the product or service, which the Government would allow as a cost without question. Why, then, should an internal unit supplying the product or service fare any worse? Adequate safe-

guards can be established to assure that the selling unit's prices are competitive, or that its costs and profit return are reasonable. To adopt any other policy is to penalize the very degree of integration which the Government seeks in choosing a weapons system contractor.

"Profit upon a profit" is just a catch-phrase implying culpability, but is wholly without validity. Every purchase that is made by an individual or by a corporation is at a price which probably includes a profit on many profits. That is our fundamental economic system, and is nothing of which to be ashamed.

The only valid questions are (1) is the total price competitive, or if no basis for such a finding exists, then (2) are the aggregate costs reasonable, and (3) is the total profit of the contractor, however and wherever derived, equitable and compensatory for the services to be rendered, work to be performed and responsibility to be assumed. Inter-divisional or other intra-company transactions should not be penalized if integration is an attribute being purchased!

## Cost of Leadership

Achievement of integration to the extent which makes possible the acceptance of weapons system responsibility almost inevitably requires the corporation to have become large and financially strong. This means that it will probably have outstanding several kinds of securities, stocks and other obligations. Under Government contracts, however, it will not be allowed to recover several kinds of costs which it must incur to retain its capitalization and its very existence. Examples are costs of reorganization, of issuing additional stocks or bonds, of registering on security exchanges, of local taxes on security issues, of stockholder and financial relations, and of institutional and financial advertising.

The integrated weapons system contractor must be able to finance vastly larger amounts of working capital requirements. As weapons grow more complex, lead times between conception and production increase, and all kinds of expenses tend to find their way into inventories instead of into billings. The Government must retain its rights to terminate such contracts unilaterally and at its sole convenience, but this very necessity means that the financing of working capital needs usually must be by short-term borrowings rather than issues of equity stocks. The interest costs of such borrowings continue to be unallowable costs under Government contracts, but the integration being sought in weapons system contractors creates the need for the greatest volume of such loans.

To summarize, these and other Government pricing and cost disallowance policies are tending to impede or discourage the degree of integration that is needed in contractors able and willing to undertake weapons system responsibilities. If America's defense industry is to remain strong, and if it is to operate within the framework of our traditional free enterprise system, then these policies and practices should be re-evaluated, and revised to encourage strength rather than to sap our resources.

The key is profit—an understanding of profit, the uses of profit, the essentiality of profit, and for what profit is paid. Technical leadership is worth a profit; management is worth a profit; production is worth a profit; procurement skill is worth a profit; assembly and test are worth a profit. Each are different profits, and no one can take the place of all, or of another. If this concept is understood and equitably applied in Government procurement, Government prime contractors will no longer have to continue their role as second-class industrial citizens, rewarded at substantially less returns than their commercial counterparts.

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# How To Simplify Army Organization

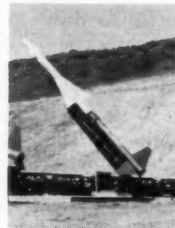
by Major Robert T. Willets  
Engineer Section, V Corps



Combat



Logistics



Engineering



Administrative

*The Army of the next two decades is faced with radical and accelerating technological changes. To meet these changes in a manner that adequately provides for the defense and is commensurate with conservation of the Nation's resources we must provide a dynamic, imaginative, and flexible organization.*

*Philosophical analysis, scientific research, and bold application of empirical data are required in framing the new army structure. . . .*

THE Army of the future will incorporate certain features without which it cannot long survive, or accomplish its mission of defense. These include, among others, minimum concentrations, maximum rapidity of movement, economy of dollars, increased technical ability, flexibility, independence of action, attractiveness, and moral integrity.

The combat commander must be able to operate in a semi-autonomous state. He requires the capability of high rates of speed in the movement of his subordinate elements. Instantaneous, dependable, and direct communications are mandatory. Flexibility must range from foot to air in movement, from the individual use of the

clubbed rifle to mass exploitation of nuclear weapons in combat, and from complete independence of action to being an integrated team member. He will have to operate over a wide front, in great depth, or with no front, and he will have to fight night and day, arctic and tropic, and in all areas in between.

The men that make up this army must have, of necessity, the qualities of Plato's philosopher-kings. These people must be mentally capable of assuming technical responsibilities; they must be physically capable of individual combat. Leadership is a requisite trait of all personnel.

There must be a reduction to a minimum of intermediate headquarters.

Clausewitz points out that, "With every additional step through which an order has to pass, it is weakened in two ways; first by loss of force; second by the longer time it needs for transmission." Tactical staffs must be reduced in size. The speed of the machines of war have out-distanced the speed of the typewriter, the mimeograph, and the formal staff study. A fine balance is required providing for centralized planning on one hand and decentralized execution on the other.

The ratio of non-combat troops to combat troops must be reduced, perhaps eliminating all together the so-called non-combat soldier. This idea, though not new, gains in importance as the masses of the East continue to grow in concert against western civilization. Training of the soldier of the future will require more time for specialized techniques. Less and less time will be available for the so-called non-specialized functions.

Increased generalization of training in the combat areas is mandatory for all, with one or more specialties as secondary job fields. For example: A private might be first an assistant machine gunner, second an atomic demolition specialist, and possibly third a truck driver; a sergeant might first be a combat squad leader and secondly job personnel clerk; a lieutenant might be a combat platoon leader, and second a maintenance expert.

A compact, mobile, fighting unit must be developed as the keystone to success. Perhaps this is the new Battle Group, but it needs more fire power, more mobility, and more shock action. It needs expeditors in the technical staff fields.

The unit must have direct, uninterrupted, and express channels to support agencies. Administrative and logistical procedures must be simplified. The trend to increase loads (weights) must be reversed. A unit replacement system is needed, probably at the company-troop-battery level only.

New concepts of routes of communication are required. Road-bound armies date at least from the time of Rome. Reliance on railroads dates from the Civil War. The airplane of WW II did not materially change our ties to roads and rails. We need the mobility of the great Kahns at great speeds. Devices for the rapid elimination of ground and water obstacles must be developed.

Stabilization of personnel policies is essential to retention, on a career basis, of desirable people. Present vacillation leads to a transient personnel structure costly in dollars, expensive in time, and non-productive in effort. It is impossible to expect loyalty and integrity from people working for a government

that, in the past several years, has displayed an increasing lack of these qualities towards its military employees.

## The Questions

1. What organization will provide the most effective fighting force? A grouping composed of infantry, armor, and artillery branches, each well trained in its specific field of war, or a single broadly trained and integrated combat team?

2. What organization will provide the most efficient supply service? A grouping composed of several branches having diverse missions one of which is supply of specified items, or a single technical and specialized logistical service?

3. What organization will provide the most economical and timely maintenance facility? A grouping composed of several branches having parallel shop equipage, or a single fully equipped and technically trained maintenance service?

4. What organization will provide the maximum scientific effort? A grouping composed of several branches each requiring engineering and scientific training, or a single scientifically trained and integrated engineer team?

5. What organization will provide the most efficient administrative service? A "do-it-yourself" administrative system, or a single specifically trained administrative service?

Analysis of answers to these questions will provide a positive approach to the determination of what organization will result in the most simple, direct and effective solution to present day complexities. One possible grouping of answers is presented here in the same order as the questions are asked.

## The Answers

### 1. Combat organization.

Despite contrary propaganda, the only way known to man to enforce his will on another man is to personally and physically join him in combat. To improve man's fighting ability science continues to develop new machines. With each succeeding year these machines become more technical and more complicated. A clear and accurate understanding of their capabilities and limitations is vital if the commander is to exploit them to their maximum.

It may be generally agreed that all branches are interested in all of these machines. However, some are more interested in certain items than in others.

The infantry is concerned with the small, man-handled machines of war. The armor is primarily interested in the equipment that provides shock action. The artillery is interested in the machines that throw projectiles at the enemy.

With advancing technology applied to the family of military machines responsibilities for teaching, maintaining and using have been divided and subdivided, specializing to the point perhaps of over-specialization. Each of the combat arms thus grow further and further apart. Each develops its own traditions of how the war was won—it is the "queen of battle," the "combat arm of decision," or has top priority "missilitis." Previous wars have been fought for material things. The next war may be known as the "battle for the mind of man."

In a war for material things, supply and logistics can and have turned the tide of battle. In the next war I wonder if the weight on brain power may not spell the difference between victory and defeat? Material things must be there—yes, but the side with the greatest know-how will be the winner. If this is the case we had better moderate the idea of specialization within the combat branches.

There are several ways of developing the integrated combat element concept. The present combat arms of infantry, armor and artillery could be combined into one homogenous element—the combat branch. Inherent in this solution are all the problems of breaking down the well-built fences of tradition. The identity of the combat arms could be retained in name while the training curriculum was changed to embrace all combat techniques providing in fact if not in name a combat branch. This would be a complex and time consuming program.

Perhaps the salvation here is the retention of combat arms identity at the company grade level leading into a generalized combat branch for the field grades. The advantages would be large, the difficulties small.

Commanders would have a versatility not now known. Leaders subordinate to them would have equal flexibility. A uniformity of training could be developed that would produce a more solidly knit fighting team, and a more economical utilization of resources. This type of organization would provide an economy of force not otherwise possible. Further it would provide for simplification of organization.

### 2. Supply organization.

Supplying the several million things the army uses encompasses extremely wide fields in types, dollars and ac-

tions. It ranges across every product represented on the stock exchanges. It is astronomical in dollar volume. It is concerned with all actions from procurement to inspection of consumer agencies. Without it the military as a corporate body vanishes.

Today's organization for supply is composed of a complex of several agencies charged with various segments of the supply problem. This segmentation traverses all fields of supply, and is not compartmentalized within fields. This means that each agency must obtain money, procure, store, account for, and otherwise administer supply. Each agency's solution to the problem is similar, but nonetheless, each has its own *modus operandi*.

Nearly all of the supply agencies have a major non-supply function. This results, not infrequently, in supply receiving second priority attention at least somewhere along the line.

Duplication of effort does not stop here but goes deeper affecting many specific items. Is your saw an engineer saw, or a quartermaster saw? Who is responsible for supplying that screw driver? Engineers? Ordnance? Signal? Then, of course, there is the constant switching of supply responsibility. The rope you went to Engineer supply for last year and found was a Quartermaster item, you now find is an Engineer item again—or is it the other way around!

The problem here is to reduce confusion, increase efficiency, insure economy, and guarantee speedy and accurate delivery of correct items. Straight line managerial procedures should provide the desired simplification. Establish one supply agency which might be called the Logistical branch.

Give them the responsibility for all matters relative to supply from procurement to delivery. This will eliminate duplication of supply effort, duplicity of branch functions, and multiplicity of procedures. Individuals will become technically proficient thus giving better service. Units of battalions-size and larger should be provided with S4's and C4's from the Logistical branch. When we have a toothache we do not go to the optometrist. Why do we train an infantry officer in the art of combat and make him a supply officer?

### 3. Maintenance organization.

Military maintenance is basically dependent upon mechanical and electrical engineering. In today's Army the Ordnance, Engineers, and Signal Corps support major maintenance programs. With some variations the equipment, tools, machines, shops, training and skills required by each of these

branches are the same.

This division of maintenance responsibility results in three different maintenance programs. The forms and administration involved are different. The standards and requirements vary with the branch. The areas of responsibility overlap.

Consider the case of the truck mounted air compressor (210 cfm). It is an item of equipment for which Ordnance has maintenance responsibility for the truck chassis, and the Corps of Engineers for the compressor. From time to time Ordnance shops refuse to repair the truck until the compressor is repaired, and the Engineer shops refuse to fix the compressor until the truck is repaired!

A certain amount of duplication of effort within branches is inherent in this division of labor. In addition to its responsibilities in the field of maintenance each of the branches involved has one or more other major fields of interest. The possibility of maintenance taking second priority is real.

At first glance it appears that maintenance should receive consideration equal perhaps to supply. However, this is primarily an engineering function. Work simplification, and economy of resources probably can be better achieved if this requirement is placed in an engineering branch discussed in the next paragraph.

#### 4. Scientific organization.

In today's Army, and that of the future, scientific and engineering activities are becoming more and more extensive and complex. At the same time qualified scientists and engineers are becoming more difficult to obtain. It is absolutely essential that we squeeze the maximum production from not only our available scientifically trained people, but that we get a full dollar value for every dollar spent, and that we do not waste any materials.

Presently there are four branches vying with each other in the market places where scientists and engineers sell their services. These are the Corps of Engineers with civil engineer mission; the Ordnance Corps with, in part, a mechanical engineer mission; the Signal Corps with an electrical engineer mission and the Chemical Corps with a physio-chemical engineer mission. In the minds of some people, if not already on the drawing boards, is yet another branch, Army aviation, which will contend for engineers since this field requires aeronautical engineers. All of these branches are deep in research and development programs, many of which overlap.

The brigading of all army engineering and scientific activities under one branch of engineering could logically

be expected to reduce competition for engineers and scientists, to eliminate duplication of effort and overlapping areas of interest, and to insure maximum effective utilization of scientific resources.

This corps of scientists and engineers would have six subordinate, and closely interrelated engineering missions. Civil engineering would include construction of routes of communications, general construction and utilities, combat engineering, mapping, and the federal civil works program. Mechanical engineers would oversee the army maintenance system to include the provision of repair facilities for all items, establishment and training in the requisite skills, standardization of the maintenance program and inspections.

The third mission is the installation and operation of the army communications system. Not only are electrical engineers required here, but also physicists, civil engineers, and mechanicals. The fourth mission is responsibility for physio-chemical warfare including physical poisons, pathological diseases, and nuclear weapons. All manner of scientists and engineers are required here in addition to chemical engineers.

The fifth mission of the corps of scientists and engineers would be that of aerial transportation. Air is basically a route of communication. It requires every kind of scientist and engineer to support this program. Construction and maintenance of landing fields, and facilities (a civilian function), operation of the aircraft (aeronautical engineer function), maintenance of aircraft (a mechanical and electrical function), and so on.

Research and development is the final function of this branch. It would be charged with the conduct of all scientific investigations, development, testing and preparation of specifications for the army.

#### 5. Administrative organization.

At the higher echelons of command, today, there exists a complex of branches involved in administration of the Army. The Adjutant General Corps manages the paper flow. The Judge Advocate General is the legal advisor, and a Military Police Corps serves as an adjunct to the enforcement of internal discipline.

In the smaller sized elements all of these duties are accomplished on a "do it yourself" basis. People well-trained as infantrymen, engineers, etc., perform the duties (for which they are poorly trained at best), of adjutants, of lawyers and judges (Courts and boards), of police (courtesy patrols), of athletic and recreation officials, and of public relations officials.

The solution the Army uses today results in a large number of different branches working with these matters. Because of decentralization, and lack of training the results are ineffectual, and conducive to wasted personnel efforts, and lost time. These missions could be placed under one branch charged with the responsibility of administering the Army organization. Training and methods could be simplified and standardized. Commanders would be relieved, not of responsibilities, but of the need to closely supervise and train inexperienced people in these duties. Personnel of this branch should be assigned to the staffs of all units from battalion level upwards.

### Suggested Approach

It is suggested that reorganization envisage four branches replacing all those now in existence. These branches might be Combat, Logistical, Engineer, and Administrative. In general terms the areas of responsibility for these branches could be as follows:

1. **Combat branch:** The Combat Branch would be responsible for the training and planning for, and the conduct of, military operations against any enemy of the United States. This branch would incorporate the present duties of the branches of infantry, armor, and artillery, and would include the broad areas of training, planning, operations and intelligence.

2. **Logistical branch:** The logistical branch would be responsible for the supply and evacuation of all material things used by the military establishment, and for the medical care of personnel. The areas considered here would be transportation, procurement, finance and accounting, merchandizing, storage and medical.

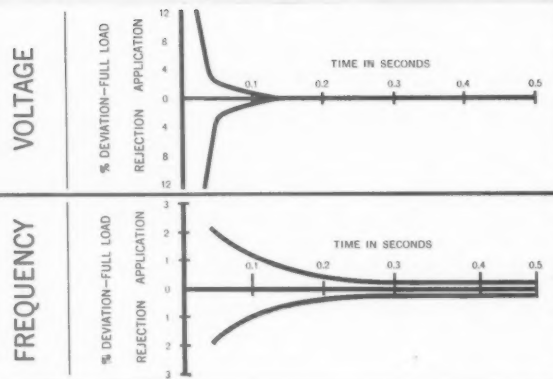
3. **Engineer Branch:** The Engineer branch would be responsible for all engineering and technological activities incident to the preparation for and the conduct of military operations against an enemy of the United States. The specific scientific fields considered here are: Civil engineering, Mechanical engineering, Electrical engineering, Physio-chemical engineering, Aeronautical engineering, and Research and development.

4. **Administrative Branch:** The Administrative Branch would be responsible for the managerial and administrative functions requisite to the efficient conduct of the military establishment. The Broad areas of interest considered here include office managers, personnel managers, lawyers and judges, law enforcement officials, public relations officials, and morale and recreation officials.





Snark Missile is powered by this Caterpillar Electric Set, photographed at Cape Canaveral, Florida. Full designation: Caterpillar 60 KW 400-cycle 120-208 Voltage Low Silhouette Portable Ground Support Unit with Precision Control Regulation.



Almost instantaneous return to normal of the new low silhouette Cat power unit (left) under conditions of full-load application and rejection is shown in the above graphs. In each case test was made under a voltage output of 117.4 volts.

# Caterpillar Engines help power U

Rocket boosters blazing a flaming trail, the Northrop Snark SM-62, first U. S. intercontinental guided missile, roars skyward from Cape Canaveral, levels out and hurtles south to the Caribbean.

The precise power used for ground support of the Snark is provided by a Cat Electric Set, designed and engineered for the missile program.

On isolated, down-range islands, the missile is picked up on radar, monitored as it streaks by, and the in-flight data is recorded and transmitted to Cape Canaveral for processing.

The power for these tracking stations—for the delicate, complex equipment and for living facilities for station personnel—is provided by Caterpillar Stationary Electric Sets.

An electric organ helps relieve the monotony of life on these vital but lonely stations. Caterpillar Engines supply the electric power needed to operate effectively in remote places.



Modern, heavy-duty diesel engines by Caterpillar are playing an important role in the rocket and missile program, and in other important military applications.

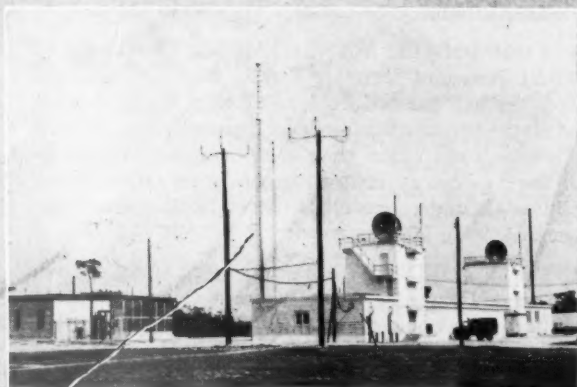
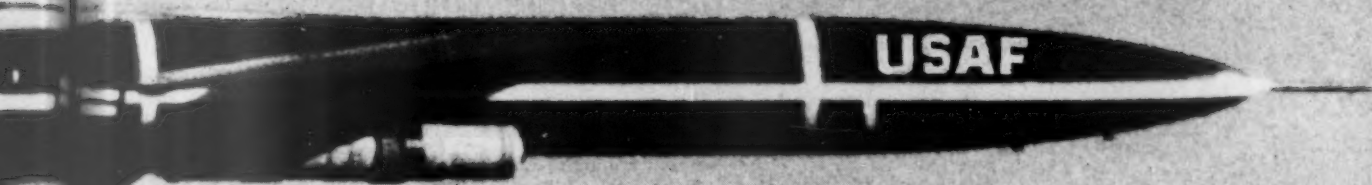
Caterpillar Engines can operate in any climate or altitude. Cat Engines were chosen to supply power for the Antarctic Expedition for the Geophysical Year (Operation Deep Freeze).

Caterpillar Engines can operate on any fuel, from JP-4 through No. 2 furnace oil, without adjustment or dilution. This means Cat Engines can use readily available fuels, eliminating storage or safety problems.

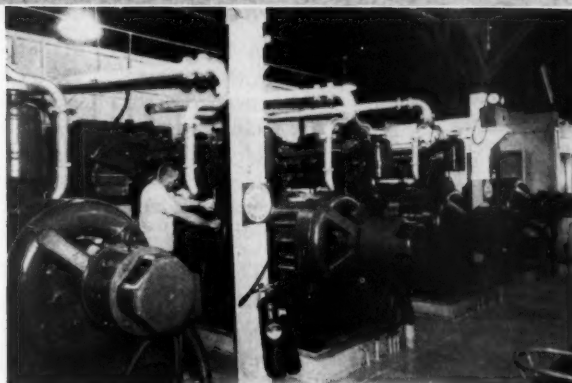
Relatively untrained personnel can operate and maintain these dependable power packages. Only

Weather information needed for missile testing is gathered in this weather station on Eleuthera. Precision equipment used here demands steady, constant diesel-produced electricity.





Central Control at Grand Bahamas Auxiliary Air Force Base is powered by Cat Electric Sets. This is one of 12 such stations that chain southeastward from the Florida Coast to Ascension Island, south of the Equator between Brazil and Africa.



These are Caterpillar Engines supplying electric power on Eleuthera Auxiliary Air Force Base, one of the down-range tracking stations. Each of the engines, generating as much as 68,000 KWH each month, has been operated more than 90,000 hrs.

## er United States missile program

two minor adjustments are necessary on a Cat Engine: fan belts and valve clearance.

An important factor in military preference for engines by Caterpillar is the world-wide availability of Caterpillar parts and service—832 facilities in the Free World; 398 of them within the Continental United States.

Modern, heavy-duty Caterpillar Engines are a result of more than a quarter century of diesel leadership. Creative engineering plus a quality of workmanship that is the standard of the industry has made Caterpillar power an overwhelming choice where precise, dependable diesel engines are a must.

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

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Special Governmental Projects, Dept. AF11, Engine Division  
CATERPILLAR TRACTOR CO., Peoria, Ill.

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## Procurement and Logistics

**SIMPLER AIR DEFENSE INSTALLATIONS** are likely to result from the assignment of an Air Force Installation Engineer full time to the Air Defense Systems Integration Division in Massachusetts. Aim would be to avoid more problems similar to those which occurred with Bomarc (see AFM page 12). Squeeze will be on the contractors, who have tended to build over-complex systems in the past.

**A PROPOSAL TO SET UP COMMODITY MANAGEMENT CENTERS** is knocking around the offices of S&L Assistant Secretary Perkins McGuire. Recommended in an interim report from the half-finished Logistic Systems Study Project, the center is a variation of the single procurement concept (whereby one Service buys a common item for all three Services rather than each being responsible to buy their own). Center would have inventory control, procurement, distribution and standardization responsibilities all under one office. Most likely guinea pig: Military Petroleum Supply Agency.

**TOP TWO PACKAGING NEEDS IN THE NAVY** are in the areas of radioactive material and space work. In the second category, Navy scientists point out that a moon-shot payload with present hardware would cost roughly \$100,000 per pound.

**LIKELY SUCCESSOR TO THE BULL-PUP AIR TO SURFACE MISSILE** is known as White Lance. The White Lance will have atomic capacity and will be used by Tactical Air Command. Contractor is the Martin Co.

**RIGHT TO CHANGE TEAM MEMBERS WILL BE RESERVED BY AIR FORCE** in an attempt to get best possible equipment. AF feels that the team is simply a means of reducing individual company costs, and nothing to be considered firm.

**BALLISTIC SUPPLY MISSILES RANK HIGH** on Army's list of things to buy. This was repeatedly emphasized by participants at the recent AUSA convention in Washington. It is unlikely that the short-range Convair Lobber will keep Army happy for long—a full blown long-range missile presently appears to be Army's goal.

**ARMY'S HAWK AIR DEFENSE MISSILE** is fast outgrowing its original tactical status in the minds of many Army leaders. Much of Army's \$594 million air defense construction budget for FY 60 will go to building fixed Hawk sites. From these locations, the missile would be used as a strategic defense against low-flying Soviet bombers in event of war.

**AIR MATERIEL PROFIT STUDIES** show a need to increase industry rewards for efficient performance and management. At the same time, AMC officials are convinced that the current profit level is adequate.

**INCREASED IMPORTANCE FOR THE FORTHCOMING NIKE-ZEUS** air defense missile lies in its capability to knock out submarine launched intermediate range ballistic missiles. Nike-Zeus was originally designed as a defense missile to be used against ICBMs.

**NAVY BUDGETING FOR FY 1960** will be about the same as it has been for the past two years, say top Navy sources. In the same area, Air Force spending will probably stay within estimates for FY 1959 with no major reprogramming until after a fix is made on fiscal 1960. At that point, production rates may be slightly scaled down to avoid cutbacks next year.

**LONG-RANGE, ALL-WEATHER INTERCEPTOR DECISION** should come from Navy late this month. Top two contenders are Chance-Vought's F8U-3 and the McDonnell F4H-1.

**A BIG HELICOPTER BEYOND THE H-37** is not causing anyone in the Army to lose sleep. Short of a major breakthrough, Army would be happier with a VTOL/STOL plane which can be armed in the same way that present helicopters are.

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## Thor Plays Guinea Pig In Spares Provisioning

The Thor IRBM is serving as a guinea pig for the Air Materiel Command supply officers who are presently working out spares provisioning for the ballistic missiles.

Current provisioning actions call for organizational maintenance spares and for depot maintenance spares, including the following:

(1) Airframes, 4,500 for organizational maintenance spares, with depot maintenance spares totalling 17,476; (2) 2,000 propulsion units for organizational maintenance spares and 2,435 for depot maintenance spares; (3) Guidance units of 2,500 for organizational work, and 3,200 for depot level; (4) Nose cones, 600, with 1,100 depot spares; (5) Lox generators for the organizational units, with the depot spares figures not yet set.

Minimum essential stocks of missile spares are figured to sustain instant readiness. This is currently defined as a quantity equal to 10 days of normal operation for provisioning and pre-stocking purposes.

So far, AF has provisioned 10,946 spare items at a total cost of \$14,700,000. These figures do not include complete spare engines. They do include some depot level support items.

## Subcontract Plant Rep Called Ineffective

The Senate Small Business Committee has suggested that Defense Department's "ineffective" defense-subcontractor plant representatives be supplemented by liaison personnel from the Small Business Administration.

This suggestion was included in a report to the Senate group by SBA, and compiled by a survey team of



Beach-to-water take-off demonstrates versatility of universal landing gear as used on Army's de Havilland Otter. Manufactured by All American Engineering Co., the new gear will aid Army operations over all terrain.

small business specialists. The report sharply criticised DOD efforts to aid small business.

The report said that present small business liaison personnel of the prime contractors do not participate in the build-or-buy decisions, and that there was no desire "on the part of prime contractors to rotate bidders lists regardless of their size."

## Air Force Sees Fewer Maintenance Contracts

Fewer numbers of weapons, with highly specialized maintenance requirements will inevitably result in a decline in the number of outside maintenance contracts let by the Air Force in the future.

Maj. Gen. Frank A. Bogart, Air Materiel Command's Director of Plans and Programs told the recent Dallas, Tex. Air Force Association meeting that "It is inevitable that total depot level maintenance will decrease as the increased effectiveness of newer weapons enables us to perform our missions with a smaller force structure and as missiles, with their smaller maintenance workload, replace aircraft."

Bogart said three factors would have an important part to play in the coming cutback: (1) the obligation Air Force

feels to present contract maintenance firms, (2) the real benefits to be gained by contract maintenance, and (3) the need to retain ability to maintain first-line weapons in-house, so as to be constantly ready, under all conditions.

Policy for the move will be to contract this type work on those systems so new that they are not within the primary AF strike force, and on those which do not need to respond immediately to defense emergencies. He also said that decisions would be made on an individual system basis, to avoid duplication of facilities.

"While we intend to upgrade our own internal skills and to modernize our facilities to provide first line support to both missiles and aircraft, this will be done on a rational basis with as much use being made of existing contractor facilities as possible without compromising overall operational readiness."

## Ballistic Missiles Ahead of Schedule

U.S. ballistic missiles are on or ahead of schedule, according to Air Force Deputy Chief of Staff for Materiel, Lt. Gen. C. S. Irvine. Gen. Irvine told a recent meeting of the Night Fighters' Association that "We are stocking up hardware ahead of the people who are building the bases for the intermediate ballistic missiles in Europe."

However, Irvine noted that in many areas, the Russians are still outstripping us. Because of this, he said, "The industrial network of the U.S. must redouble its efforts to produce combat equipment of greater reliability and capability. They must accentuate automation to increase output per man-hour and ride roughshod over the technological barriers that block the pathway to effective aerospace operations. Either we must do this or learn to speak Russian."

Gen. Irvine predicted that radar ranges of 1000 miles were not unexpected, and said that results with the Hound Dog guided missile have



Lockheed C-130 Hercules lifts T-37 jet trainer to Peru. T-37's wing was removed and stowed alongside for the long hop.

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been encouraging enough to warrant study on similar weapons for the B-52 and the B-70.

Irvine also said that there was no question that the Air Force would continue to produce both Titan and Minuteman missiles. This view was echoed by Lt. Gen. S. E. Anderson, who said that the two missiles did not constitute competition.

### Army Will Spend More For Air Defense Sites

A \$564 million bill will be run up by Army for Air Defense site construction during the period 1953-59. In fiscal 1960, Army will spend virtually the same amount for Nike-Hercules and Hawk missile sites.

These figures were given to the recent Association of the U.S. Army convention in Washington, D.C., during a panel discussion of Air Defense needs and operations led by U.S. Army Air Defense Command CG, Lt. Gen. Charles E. Hart.

Hart told the convention that there was a need for both area and point type air defense missiles. He also said that the Nike-Hercules can destroy any bomber now flying, and that the Nike-Zeus would be able to take out submarine launched missiles, as well as the larger ICBMs.

Hart said that the Army's Missile Master could and would be made compatible with Air Forces' Semi-Automatic Ground Environment system (SAGE). He also said that Army would not look for the "perfect, one-shot" missile with 100% kill probability, but would settle for less performance at less cost.

### Supersonic Aircraft Not Best for Army

Effective battlefield reconnaissance cannot be handled with supersonic or near supersonic aircraft, according to Army's Chief of Research and Development, Lt. Gen. Arthur G. Trudeau. What the Army needs in this line, he said, is something "low and slow," conceivably flying only ten feet off the ground.

Along the same line, Trudeau said the 5,000 lb. limit in connection with battlefield surveillance aircraft does the Army about as much good as "covered wagons."

Supersonic aircraft, he said, "move over the area so fast that the ground clutter doesn't let them see what's on the ground to a considerable extent . . . We want to get over the battlefield. We want to fly low and slow. We want to move as silently as we can."

### AF Gives Top Priority To Warning Aircraft

Air Force has assigned a top priority to development of a new Airborne Early Warning type airplane. Informed sources say this priority stems from the recent reports that Russia is flying a newer, larger delta-wing aircraft.

Main point of contention in choosing an aircraft of this type is between pure jet and turboprop aircraft. While the turboprop craft have considerably more range, they are not able to match the speed and altitudes that the pure jet can turn out.

While the Air Force would ideally prefer a nuclear powered plane, with an indefinite range and cruising time, present proposals for the AEW picket plane are for standard jet and turboprop aircraft.

Presently competing are Lockheed Aircraft Corp., with either a new plane or a modified Electra; Boeing, with a pure jet craft; Douglas, with a turboprop conversion of the DC-7C; and Convair, acting as systems manager on a plane based on Canadair's CL-44.

As for the nuclear powered plane, AF is seeking funds for at least two prototypes, and General Electric claims to have the ability to provide a propulsion system.

### Strategic Weapons Stressed by Twining

Because priorities must be based on "enemy capabilities and not on enemy intentions" there will be future emphasis on strategic weapons systems, according to Chairman of the Joint Chiefs of Staff, Gen. Nathan Twining. With this need, airlift, air defense and tactical air support will have to take second priority, he said.

Twining also said that military personnel strengths were not likely to increase in the near future, and that "the Army should be a compact mobile, hard-hitting outfit with a minimum of supporting impedimenta. The majority of combat equipment should be capable of movement by air or fast ship. In the past we have paid a lot of attention to protective measures, such as heavy armor . . . I believe the emphasis should be on firepower and speed."

The type of mobility he was talking about, he said, ruled out such heavy missiles as Redstones, Corporals and Honest Johns as being "not really mobile in the sense of rapid movement in the battle area."

Twining also called communications the "weakest link in all three services,"

ARMED FORCES MANAGEMENT

and said there was need for "continued effort, especially in the low-yield nuclear and optimum fragmentation areas."

## Spare Parts Policies Amended by Air Force

Policies for obtaining spare parts for aircraft or missiles out of commission or not fully operative have been set by the Air Force in amended Air Force Regulation 67-75.

The AFR states that parts may be diverted from production aircraft, missiles, or from government, contractor or subcontractor furnished equipment being retained or manufactured when high-priority aircraft or missiles are inoperable. The regulation says that if such diversion means delay in delivery schedules, approval for the diversion must be had from Air Materiel Command.

Critical spares will not be taken from depot stocks to support production lines when this would ground unit equipment aircraft in tactical units, or jeopardize operational readiness of these aircraft. Neither will this be done when the parts are needed to return aircraft or missiles to combat-ready condition.

The regulation says that each critical shortage will be evaluated to find whether the short item should be shipped to fill needs in repairing, or kept for the production line. Military considerations will dictate the decisions.

## Defense Pump Priming Hit by Congressman

The "faulty practice" of priming the nation's economy with defense funds recently came under fire by Rep. Jamie Whitten (D-Miss.), a member of the House Appropriations committee.

The Mississippi Congressman cited the record as showing that "we have placed military contracts in order to keep plants going, to spread employment and things of that sort.

"Defense is absolutely necessary; but so far as the economy is concerned, while needless defense spending may provide money and give the appearance of local prosperity, it is actually a drain on the national economy, contributes no usable goods, and is largely the cause of the present deficit spending and inflationary trend spiral which leaves our government facing about a \$12 billion deficit in the coming fiscal year."

NOVEMBER 1958



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# Reorganization at AMC

## Aims for Faster Decisions

*Stepped up missile buying, heavier emphasis on the Weapons System Concept and an attempt to free staff officers from day-to-day administrative work are behind the recent organizational overhaul at Air Materiel Command. Faced with these problems, this is how the Air Force has gone about solving them . . .*

**I**NCREASED missile buying plans, heavier emphasis on the Weapons System buying concept, and general desire for more effective procurement operations have dictated a major organizational overhaul for the Air Materiel Command Directorate of Procurement and Production.

Major overhaul aims are to answer recommendations in the ARDC-sponsored Stever Report, that the Air Research and Development Command do its own buying, and, second, to separate policy/management functions of the Directorate from the day-to-day operations handled in the Weapons System Project offices. Feeling, as

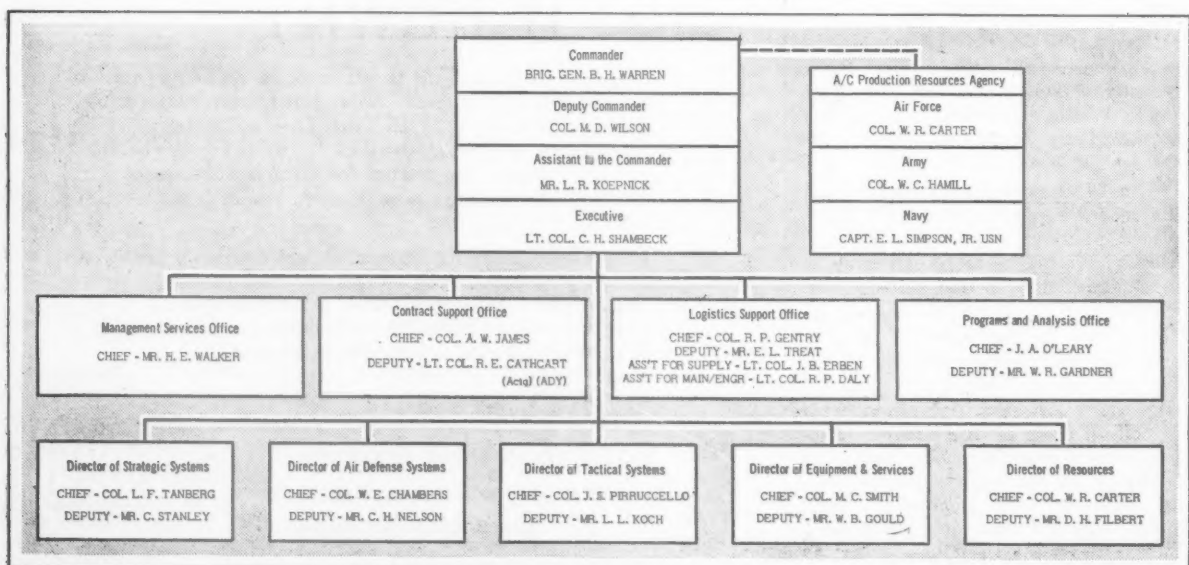
voiced by AMC Commander Gen. E. W. Rawlings, was that staff elements in the Directorate were becoming buried in operations-level decisions and paperwork.

The Directorate of Procurement and Production, which supervises worldwide Air Force buying, will be physically separated from operating sections of the former directorate. To be headed by Maj. Gen. William O. Senter, the new office will continue to serve in a managerial capacity. Senter will have Deputies for both Procurement and Production, with Col. W. R. Graalman serving in the Procurement slot, and Brig. Gen. W.

A. Davis as Deputy for Production. The overall Directorate will number 350.

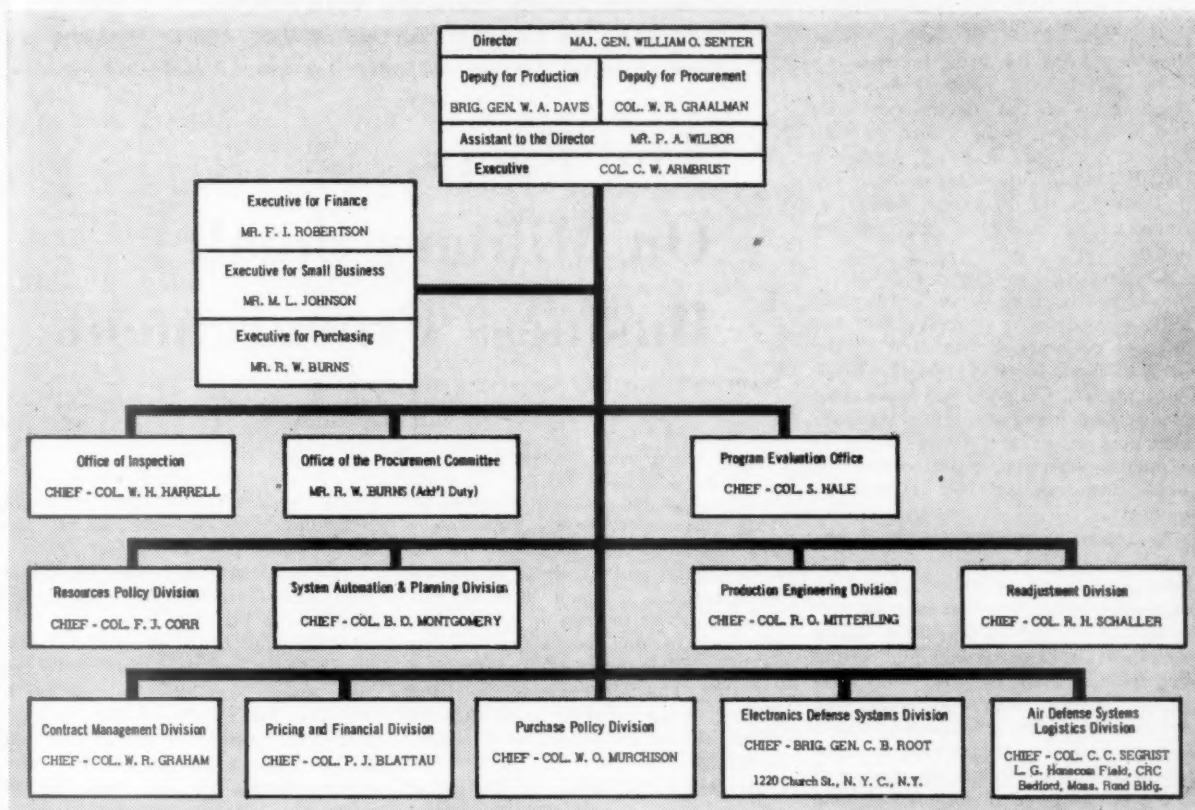
Handling the day-to-day Air Force industry relationships will be the newly-named AMC Aeronautical Systems Center, headed by Brig. Gen. Beverly H. Warren. This group will consist of the Weapon Systems Project Offices. Gen. Warren will report directly to AMC Commander Gen. E. W. Rawlings. At the same time, the AMC Ballistic Missiles Center (formerly Office) will operate in a parallel manner, and will have direct to AMC Commander Gen. E. W. Rawlings. Under Gen. Warren will be

### AMC AERONAUTICAL SYSTEMS CENTER



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## DIRECTORATE OF PROCUREMENT AND PRODUCTION



roughly 1500 people, and the offices will remain in their present location.

This group will be set up with the following subsidiaries, composed of Weapon Systems Project Offices: (1) Strategic Systems, handling the B-52, B-58, B-70, Strategic missiles, guided air missiles, tankers and advanced nuclear bombers; (2) Air Defense Systems, handling the F-101, F-106, F-108, guided air rockets, Bomarc, drones and electronic support systems; (3) Tactical Systems, including F-104, F-105, tactical missiles, transport, trainer and helicopter/liason craft; (4) Equipment and Services, with six divisions, covering propulsion, guidance, communications and reconnaissance, accessories, specialized procurement and government-furnished aircraft equipment control, and (5) Resources, handling industrial facilities, manufacturing methods and materiel control.

According to Gen. Rawlings, "The objective of the relocation is to separate world-wide staff surveillance of procurement and production from implementation of weapon systems concept and central buying functions." The Directorate, under Maj. Gen. Senter, will be located in AMC Headquarters with Gen. Rawlings.

Moving with Gen. Senter will be three divisions of the Deputy for Production's office—(1) Production Management, (2) Production Engineering, and (3) Production Planning. Under the Deputy for Procurement will remain (1) Purchase policy, (2) Pricing policy, (3) Readjustment, and (4) Contract management.

In explaining the reorganization to a local chapter of the National Association of Manufacturers' Representatives, Gen. Warren pointed out that "Our present estimates are that by 1961-62, we will be spending roughly twice as much money for missiles as for manned aircraft . . . our key approach to industry in getting new weapon systems is through the weapon systems concept. This concept is not an abstract managerial idea of a way in which to organize. It has strong and real foundations grounded in the nature of the weapons systems themselves . . . The necessity for this pattern of contracting I believe is with us permanently and will become increasingly more important as the more complex weapons are created."

On the reorganization itself, Gen. Warren said "We sincerely believe that by this strengthening effort that we will reduce the span of contact

by industry for specific information and decisions on weapon systems. Secondly, by increasing the authority and responsibility of the WSPO's, we are providing you [the manufacturers] with an organization with wider decision-making power and which can cut the internal time requirements for a final decision to you. Next, this change enables us to make much better use of our specialized personnel within the Air Force . . . specifically, ARDC and AMC, which in turn can give you more competent and rapid service on your problems which need to be brought to our attention. We also feel that this move will get us a step closer to our overall national objective of getting superior weapon systems as fast as possible."

The move will take place over the next few months, and minor changes in the original plan are likely. Says Maj. Gen. Senter, "There will probably be minor changes in this plan as we go through our refinement period. However, basically, we foresee no major change, because with this organization we can best carry out our responsibility of delivering to the using commands the best in air weapons and their support equipment."

WITH each new year, swarms of military procurement people are called before Congressional investigating subcommittees to explain what they are doing for small business.

Interlaced with political overtones (sticking up for the "defenseless" little guy is supposed to be a sure-fire vote getter), a good deal of smoke is usually blown up, creates the impression that small business doesn't receive a fair share of the military dollar.

Congress, the ultimate guardian of public funds, does have a responsibility to watch the program. But, too often, a politician has ignored all the facts to work his way into the headlines. Fact is, Congress still hears complaints but legitimate complaints are becoming fewer and fewer lately, as a greater understanding is created of small business' real role in military buying.

Best case in point, probably, is the Air Force, which annually of late has been authorized to spend almost as much money as the other two Services combined. However, its story differs only in tenths of percentage points from the facts related by the Army and Navy. The net result is the same. The Air Force problem (of how to place a fair proportion of contracts with small business) is unlike that of the Army and Navy in only one major area. Unlike Army-owned arsenals and the Navy's shipyards, Air Force does not manufacture anything and does not do final assembly.

Over 85% of the procurement dollars the Air Force itself spends go into aircraft, engines, missiles and complex aeronautical equipment requiring capital, facilities, and engineering capability generally beyond the scope of small business concerns.\*

In fact, weapons systems are becoming so complicated even the big companies are being forced to team up. (See ARMED FORCES MANAGEMENT, August, 1958, pp. 20 & 26). This rapidly developing complexity ordinarily would make it even more difficult for small concerns to grab a big chunk of the military dollar. Among the reasons:

1—Small business is just too small to handle the job

2—Because they are not involved in early R&D stages, they lack the know-how and tooling to bid competitively

3—They can't afford to buy the expensive equipment which will produce something having only, for them, a limited military product application.

From the nature of the animal, it is

\* The debaters loosely define small business as being a firm with 500 or less employees.

*Is small business being frozen out of the military market as weapons become more and more complex? Are critics, particularly in Congress, correct in their charge that the Services favor the big companies too much? Here are . . .*

## The Facts On Military Small Business Procurement

by Bill Borklund

obvious that the greatest potential for small business concerns is in acting as subcontractors and suppliers—a fact rarely mentioned in those committee investigations. If small business concerns are to participate in military procurement to any great extent, an aggressive subcontracting program is a necessity. The Services recognized this when they set up their Small Business offices. (The Air Force created its SBO in 1951.)

An Air Force survey on the extent of small business subcontractor participation in 1951 disclosed that:

1—Prime contractors retained an average of 48% dollar-wise

2—Primes placed outside with large business concerns subcontracts of a type not susceptible to further subcontracting—9%.

3—22% of subcontracts placed by primes with large concerns were of a type susceptible to further subcontracting.

4—Primes and their major subcontractors placed with small business concerns—21%.

### Background

Before World War II, subcontracting in the airframe industry amounted to about 8% of dollars spent. During World War II, it reached a high of 40%. It was a painful and costly operation building up to that figure. After World War II, within two years, subcontracting in the airframe industry dropped to an all-time low of 6%, and gradually increased to 20% in 1950 due to the build-up necessitated by world conditions. By 1953, the percentage had climbed to 35 but following the end of Korean hostilities in 1954, the figure dropped again. Even so, it dropped to only 28%.

The Air Force had no wish to repeat the necessity of a rapid and

costly build-up, and the negotiation procedures for subcontracting (see below) were put into effect.

Without a change in the negotiation procedure, Air Materiel Command could have expected a drop to 26% by 1955 and 20% a year later. However, AMC reversed the prediction and pushed the 1955 percentage to 30. The full effects of the contracts placed then will be felt this year, and on the basis of the established trend, subcontracting in the airframe industry in 1958 is expected to be at an unprecedented peacetime high.

### How it Works

In negotiating contracts for weapon systems, which account for most of the Air Force's procurement dollars, the prime contractor is required to submit a proposed subcontracting structure with his original management proposal. This proposed structure is reviewed and evaluated and must be approved by AMC prior to award of the contract.

The review considers the percentage of off-site and on-site production proposed by the contractor in an item-by-item evaluation. The percentage is compared to the percentage of other contractors producing similar aircraft or engines and also the percentage of the industry as a whole.

The feasibility of subcontracting additional items is considered. First, can it be done; and secondly, should it be done from a facilities and technical capability standpoint so as not to duplicate existing open capacity or technical capability. Negotiations are conducted with the proposed contractor to establish the maximum practicable structure.

A typical subcontract negotiation was carried out as follows:

(a) The contractor proposed a mini-

ARMED FORCES MANAGEMENT



imum subcontracting. AMC was not satisfied.

(b) After reconsidering, the contractor then proposed approximately 26% subcontracting, plus 10% purchase parts.

(c) This proposal was compared with the industry average which was found to be 30.2% with all aircraft companies and 32% for those building bombers.

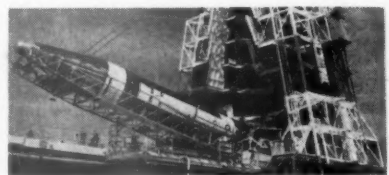
(d) Negotiations were conducted and additional items were recommended by AMC for subcontracting. These items included inboard ailerons, flaps, outside doors and certain wing sections.

(e) As a result of the negotiations, the contractor agreed to increase subcontracting to a total of over 40%, not including purchase parts, and the contract was signed.



## Record on Aircraft

It is difficult to isolate a contract for a detailed analysis. However, we had an opportunity to make a semi-detailed analysis of contracts involving 1,000 B-47 bombers, 1,000 A-5 Tail Defense Fire Control Systems for these bombers and 6,000 J-47 jet engines. The consolidated value of these contracts was approximately \$1.8 billion. Of this total, the primes retained for salaries, taxes, administration, profit, etc., 32.8%. Large subcontractors received \$964 million. It is known that there was placed with small business concerns, by the primes, \$251.6 million and by certain of their large major subcontractors \$134 million—a total of \$385.6 million placed by the primes and some of their major subcontractors. In other words, small business received about 21.4% of the total value of the contracts. An additional amount was placed with small business concerns by other major subcontractors not reporting.



## What About Missiles?

There has been a good deal of conversation lately to the effect that the

missile business will be limited to a small number of large aircraft companies. There has also been talk to the effect that these primes may be reluctant to subcontract some of their work to smaller concerns. To set the record straight, Maj. Gen. Ben I. Funk, Commander, Hq. AMC Ballistic Missile Center, said recently,

"Present overall percentage of small business participation in the Ballistic Missiles Program of the Air Force (according to latest available figures) is almost 21%. This figure (is) astounding when you consider that the program to date has emphasized research and development, and is only now gradually progressing to the production stage."

He went on to cite some for instances:

1—Of total monies spent on entire Atlas and Titan programs, between 40 and 50% has been subcontracted to small business.

2—Rocketdyne, manufacturer of rocket engines for Atlas and Thor has spent nearly 67% of its contract dollars with small business.

3—Turbo Division of Sunstrand has spent 62% of their Atlas dollars the same way.

4—Douglas Aircraft has placed 23% (or \$18 million) of their Thor money in small business subcontracts.

## The Point

This pattern illustrates an important point often overlooked about small business participation in Air Force procurement:

"The major subcontractor represents a greater potential source of business for the small concerns than does the prime contractor."

The prime must, of necessity, subcontract many major subassemblies and sections that can be furnished only by large concerns. It is in the operation of the major subcontractor that these systems sections break down into parts and components that can be, and generally are, furnished by small business concerns.

As an example, one large concern, furnished to the prime the power pack and stabilizer on the aircraft involved in the negotiation process described earlier. There is no known small business source. However, in furnishing this power pack and stabilizer, the large concern relied on 88 small business vendors.

A second company was the source for two of the fuselage sections. It was classified as a large business and again there was no known small business source for these sections, but the contributions of 100 small business vendors went into these sections before they were delivered to the prime.

It must be borne in mind that the entire Air Force effort is not directed toward assisting small business to obtain only subcontracts. It has had for seven years an intensive program specifically designed to assist small business concerns in obtaining prime contracts. In the last fiscal year, (FY 1958), the Air Force placed direct with small business concerns \$756 million net, an increase of \$33 million over FY 1957.

## Prime Contracts Awarded to Small Business

Fiscal Year 1955	.....\$576,815,000
Fiscal Year 1956	.....\$685,839,000
Fiscal Year 1957	.....\$723,469,000
Fiscal Year 1958	.....\$756,527,000

(Critics harp on the fact that this represents a percentage drop—of total budget dollars—over previous years. What they don't bother to add is that the percentage falls because more dollars have to be spent now to obtain the big hardware. Actually, this \$756 million represents a very large dollar increase over the amount awarded by the Air Force in prime contracts to small business concerns during the previous year.)

There has been, in fact, a very substantial gain in awards to small business each year since 1955. That \$756 million represents a very high percentage of what Defense Department calls the small business potential, after you eliminate the amount of money which must be spent for things that small business cannot supply.

It is quite evident that the subcontracting potential is several times the amount that small business concerns can secure through prime contracts. While the Air Force placed direct with small business \$723 million in a 12 month period (FY-57), a survey of 70 of the AF's large prime contractors shows they paid, in the same period of time, to small business subcontractors \$1,765 million—or more than a billion dollars more than the Air Force was able to place direct with small business.

By percentages, this \$1.7 billion represented 21% of the dollars paid to the 70 primes. The ever-increasing complexity of equipment required for the operation and maintenance of modern air power requires an ever-increasing number of special skills and talents. These cannot be concentrated in a relatively few numbers of prime contractors and major subcontractors. They must seek these skills and talents from outside their own organizations, and more often than not, they find them possessed by small business concerns.

## Pentagon Profile

### This Month: Major General Ben I. Funk

Commander, Air Materiel Command  
Ballistic Missile Center



Kibitzing General Funk helps son John solve a math problem.

**T**HE anything but prosaic business of buying, building, and supplying for the Air Force Ballistic Missiles Program is the newest and biggest function of Armed Forces management yet seen. It is conservative to say that upon successful managing in this field depends much of the safety of the nation.

A ballistic missile, by itself, is not much of a weapon. No single specimen of armament ever is. It takes great numbers of weapons, assembled and ready and handled by trained men, to have any effect.

Procuring or producing hundreds of bayonets is easy; hundreds of bombers is a far greater task; hundreds of battleships would be a very big management problem. But the ICBM rockets are the most complex and delicate weapon systems yet created. To produce hundreds of them, to make certain they are delivered to operational troops when and where needed, to ensure that they are logistically supported, calls for direction and guidance beyond anything of its kind in military history.

The man responsible for such management in the Air Force is Major General Ben I. Funk, USAF.

On March 15, 1956, he was selected as Air Materiel Command's first Deputy Director for Ballistic Missiles. Official recognition of the management function of his office came eight months later, when he was named as AMC's Ballistic Missiles Manager.

General Funk, with his 300 or so handpicked military and civilian assistants, works out of Building Four in the sprawling "Inglewood Complex", southwest of Los Angeles. In addition to AMC's Ballistic Missiles

Office, the Complex houses ARDC's Ballistic Missiles Division, headed by Major General B. A. Schriever; the SAC-MIKE unit of Brig. Gen. W. S. Large; and the Space Technology Laboratories, of the Thompson Ramo-Wooldridge Corporation.

These four organizations comprise the management team that supervises Air Force ICBMs from drawing boards to operational launching pads. In essence, STL provides the technical guidance; SAC-MIKE coordinates for training and operational matters; BMD handles the research and development and is responsible for overall management; and General Funk's BMO is in charge of procurement, production and logistic support.

It takes more than just the average well-rounded USAF general officer to fill such a slot as General Funk's.

There must be thorough knowledge of strategic air warfare, since the ATLAS, TITAN, THOR, MINUTEMAN and other weapon systems under development are strategic, not tactical. General Ben Funk is one of the original, pre-World War II, B-17 pilots. As a lieutenant he served with the old 19th Bomb Group of strat bombing pioneers, flew during the early part of WW II in the Philippines and Indonesia, commanded his own 346th Bomb Group of B-29s in Okinawa.

Because of the advanced technologies involved, the head of BMO must also have a strong scientific background. Undergraduate Ben Funk, while at University of Denver between 1931 and 1935, virtually exhausted the curriculum of science courses related to chemical and aero engineering.

The inherent nature of BMO re-

quires a man with both deep and wide knowledge of Air Materiel Command policies and practices, and a thorough experience in Air Force contractual matters. As a major, Ben Funk served as Chief of Materiel and Equipment Section (Bomb) for Air Force Hq; his work earned him rapid promotion to lieutenant colonel, then to colonel.

Civilian industry plays a major role in building ICBMs and their supporting equipment. A spreading network of associate prime contractors, second-tier contractors, and literally thousands of sub-contractors are involved. It is necessary that the head of BMO have at least as much theoretical knowledge of management, commerce, and economics as the businessmen he must work with. As a colonel, Ben Funk earned his BS in Industrial Administration from the Air Force Institute of Technology in 1948, completed the Advanced Management Program of Harvard's School of Business the next year.

Despite this assembly of talent, training, and knowledge, General Ben Funk is more the action-type officer than the staff-and-plans variety.

He showed this characteristic early. Born in Wray, Colorado, on April 21, 1913, son of Dan C. and Maude A. Funk, he became both a top scholar and a letter-winner in four sports at Wray High. He continued this way in college; although he earned a scholarship his first year with a straight-A average, he also won his frosh numeral in football, joined Kappa Sigma fraternity, and later got his varsity D on the wrestling team.

When his industrial specialization at USAFTT and Harvard was completed he was assigned to Air Materiel

Command. This was his introduction to rockets, as Chief of the Aircraft and Missile Section at Hq AMC, Wright-Patterson AFB, in Dayton, Ohio. He had previously had staff experience in materiel at AF Hq. His command experience came with AMC in Europe, 1951-54, as Commander of 85th Maintenance Group, and later of 85th Air Depot Wing, at Erding, Germany. Here he received his promotion to brigadier general.

Returning to Dayton, General Funk was named Inspector General for the Command, a year later was assigned as Assistant for Programming.

By this time USAF had its ballistic missile program under way. ATLAS was shaping up. TITAN, a sophisticated ATLAS, was in the advanced planning state. The intermediate range THOR was approaching production. It was necessary for AMC, as the builder and buyer for Air Force, to find a man to manage its part of the program. Somebody was needed to plan, direct, and coordinate the contracting for dozens of major industries, scores of lesser ones, and great numbers of smaller firms, engaged in varying assignments building airframes, engines, electronic devices, control and guidance units, warheads and nose cones, fueling systems, launch complexes, tracking and telemetering gear, rocket sites, ground equipment, and the almost uncountable number of items related to ballistic rocketry.

The problem was given to Brigadier General Ben Funk.

He moved himself and his family (brunet, dynamic wife Judy of Dallas, Texas, and their teen-age daughter and son, Judith and John) from Ohio to Southern California. They found a rambling ranch home near the top of a green canyon in the hills south of San Fernando Valley. His family enjoyed California living while Major General Funk—he was promoted in April of this year—supervised BMO's part in the missiles program from a small cadre to its present size.

One measure of that growth is the money involved. This coming year General Funk and his people will direct the spending of almost two billion dollars. Every dollar of this will be accounted for in an AMC contract. And all these contracts will be ultimately the managerial responsibility of the youngish Ben Funk who wears two stars on his shoulders and Command Pilot wings on his chest.

It is a big responsibility. But through management training and inborn ability, Ben Funk is carrying it successfully. The big Air Force missiles rising in increasing numbers from Cape Canaveral show that.

## The Responsibilities Chart:

# A Case Study In Military Management

**K**EEPING track of his responsibilities in the complex modern Army is an arduous task for any commander, but the problem assumes extraordinarily vast proportions for the Commanding General of the U.S. Army's unique Military District of Washington.

In addition to the usual responsibilities of a continental Army command, MDW must coordinate closely with other services and government agencies in the Washington area to perform duties peculiar to the site of the nation's government and defense headquarters.

While the majority of its activities are concentrated in the metropolitan Washington area, the command's responsibilities lie as geographically distant as Fort Churchill, Manitoba, Canada, where MDW provides the necessary supply and administrative support for elements conducting cold weather equipment tests at the First Arctic Test Center, and at far-flung outposts such as the U.S. embassies at Teheran, Iran, and Moscow, Russia, where the Commanding General, Military District of Washington, exercises general court-martial jurisdiction over the attached Army elements.

Altogether, more than 4,700 separate duties have been given to the Military District of Washington through specific assignment, agreement, procedure and usage.

Major General John G. Van Houten, Commanding General, MDW, met the Herculean task of listing and documenting his responsibilities with a fundamentally simple device. A chart resembling a crossword puzzle was drawn up with a list of organizations running down and a list of services running across. As each staff section or organization is assigned responsibilities, they are marked down in one of the chart's spaces. Thus, an up-to-date account of MDW's duties is kept and the responsible organization can be found by merely running a pointer across the chart. To date, the chart indicates that MDW has more than 4,700 responsibilities which can be readily pin-pointed.

To see how the system works in actual practice, let's take an example step by step.

One of MDW's important responsibilities is supporting the 71st Missile Battalion, part of the iron ring of

NIKE antiaircraft units making up the vital perimeter protection of the Washington area. Looking down the chart, General Van Houten can see that the firing batteries and headquarters of this organization receive many services from his command.

He finds the number 11 in spaces opposite Battery B, 71st Missile Battalion, Herndon, Va., and under such titles as Buildings and Grounds, Utilities, Fire Prevention, and Real Property. This means that MDW's Cameron Station (whose code number on the chart is 11) provides these services to the missilemen.

Under the category of Signal Corps Communication he notes the number 1—the code for his own headquarters at Building T-7, Gravelly Point, Washington, D.C., which provides such services as telephone communications for Battery B. Among the many other services to this unit that he can quickly trace are dispensary, dental and veterinary care provided by Fort Myer, Va., food, laundry, dry cleaning and other Quartermaster services also supplied by Fort Myer, field maintenance of Signal equipment by Cameron Station, the use of Fort Myer's film library and the use of the photo laboratory at headquarters, MDW.

Other responsibilities, large and small, are likewise located instantly with the important facts about who receives what and where. The "why" is contained in the chart's companion—a back-up file—where all agreements made by MDW to provide services not already outlined by an Army Regulation or other directive from higher headquarters are documented in writing.

So the missilemen receive necessary logistical support, as many other varied and wide-spread activities continue. The sentinel at the Tomb of the Unknown Soldier walks his post, medics on a field exercise set up hospital tents, the 3d Infantry conducts infantry-tank training at Camp A. P. Hill, Va. General Van Houten can put his finger on his office chart to trace these activities and any of the other myriad daily duties of MDW at a second's notice. Or he can stand back and see the larger picture—the more than 4,700 spaces that mark the vital and never-ending work of his command for Washington and the surrounding area.



# How Case Histories Train Managers

*The case history system of management training is being accepted throughout the world as an effective, thorough method of training managers, but there are further advantages—*

*In writing the case history, the author must exercise organized thought, clarity, brevity of expression and careful planning. It is advantageous to all concerned. This is how the method works . . .*

by Herbert L. Myers, Jr.

**I**F a business is to run properly, there must be skilled executives in charge. The skilled, trained manager is hard to come by, both in private industry and in the Defense establishment. Because national survival depends on success in defense, DOD must work to maintain a high executive standard, through an up-to-date executive education program.

Responsible leaders in the Defense Department have recently undertaken vigorous programs to increase executive effectiveness. Army was inaugurated two advanced management courses. Air Force has expanded its pre-World War II Air Corps Engineering School to include management training in addition to its outstanding engineering programs, and Navy has its Postgraduate School at Monterey, Calif. The aim is for executive improvement, through education, and the methods must be modern.

A current trend in executive education is the growing use of case method instruction as developed by Harvard Business School. Thirty five years ago, business management case studies were practically unknown. Today, three leading business administration schools in this country use cases exclusively in graduate instruction. Two thirds of the remaining business schools use cases to some extent—either in a few courses, or as the predominate method of instruction. Most of the above service schools follow this practice. A few larger industrial firms have sponsored in-shop colleges for executive talent development, us-

ing management cases, as have, a rash of executive development short-courses.

That the case method is catching on is unquestionable, but the obvious question is "why?" The answer is equally obvious:

The case method is effective in management education because it forces the student to think for himself. One elder educator has summed it up with this idea: Wisdom can not be told, but must be acquired. The real strength of case method instruction is in developing desirable executive traits through practice. These abilities include skill to make reasoned decisions, perspective in understanding viewpoints of others, perspective relating to the job to be done, desire to engage the unknown, imagination and knowledge in developing action courses, willingness to accept responsibility for decisions made and skill in defining management problems.

Decision making ability is the ability to weigh factors in favor of a proposal with those against it. Based on this evaluation, the executive picks a course of action. The exercise of judgment inherent in buying or passing alternatives forces the student to think in terms of management considerations. The result of this is a personal approach in resolving management problems.

Understanding viewpoints of other people is an important executive trait. Cases help a specialist go beyond his own, well defined, specialized knowledge. He is invited to understand

other specialists' viewpoints and those of general executives. The technical man is urged to stretch his fixed technical solution to fit production, operating or logistical problems confronting the chief. Closely akin to understanding viewpoints of others is the sense of perspective—an awareness of objectives, principles, issues and timeliness of impending action.

Effectiveness of the case approach in gaining its potential student impact rests largely with the instructor. If he uses cases to implant preconceived conclusions on new situations and new or different ideas, there can be little creativity.

An interest in management problems involving both unknown and known facts is necessary to successful case-instruction. To study, analyze and appraise the problem, the student needs a vigorous, determined approach. The result of this exercise is a sense of confidence in results obtained. This self-assurance is accompanied by willingness to assume responsibility.

Because the teaching method is good, and because it can be applied in many situations, it is worth the time and trouble to carefully look at what goes into the successful study. Beyond this, the well-written case is a study in clear thinking. To develop this is invaluable to the executive, and by studying what is needed for a student to make his decision, the case-writer is actually preparing himself to select the facts that will be

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needed when he himself is placed in the decision making slot.

A case is an accurate account of an incident or series of incidents which portray an administrative problem or the way in which an administrative problem was solved or treated. Perhaps a case would be easier to handle if it were approached in the way a newspaper reporter would write up an automobile accident. Accurate, specific facts—the exact way the accident happened, who was involved, injuries, automobiles, road conditions, sequence of events and who was at fault—all of these would be studied. Most important would be the question of blame. To understand the accident and decide whose fault it was, the underlying facts would be essential. Accurate facts and impressions are extremely important if someone unfamiliar with the case is to read it, understand it, and make a reasonable decision, based on his understanding of what happened.

The pay-off on case value is its classroom usefulness. Classroom use requires student discussion. This educational approach gives students a chance to increase their capacity to make decisions and take appropriate action.

The first step in writing the case, is knowing what you will write about. Unless the writer is thoroughly familiar with the people and circumstances contained in the problem, he should do as much exploratory reading as he needs to become thoroughly informed. He will probably need to make interviews to secure facts not available from his earlier work. His intent to prepare the case and final case production should be cleared through his organization to avoid troubles inherent in writing problems for school use.

The case should be written in good form and correct English. A first paragraph which states the basic issue will provide the reader with some idea of the following problem. It is helpful in planning the case to prepare good topic sentences and to outline the complete content. Charts, exhibits, statistical and financial statements may be needed. Pictures tell more than words. It will be virtually impossible to write a final draft the first time. The case should be reviewed by the writer, with another person, to avoid misinformation. The process of rewriting the case is a means of clarifying it. Without this all-important quality, future use of the case is doubtful.

Material not needed in the case is often helpful for the instructor in his role as discussion monitor. Technical material not generally available can

be used in classroom discussions more effectively by an instructor's comments than by including it in the case.

Administrative cases commonly cut across several subject areas. One way to classify these areas is the functional breakdown—planning, organizing, controlling, coordinating and directing. Another way is by major staff offices, such as Plan, Materiel, Operations, Comptroller and Personnel. Other approaches are often useful. The project, proposal, or action to be taken should give the officer substantive content on the problem. For example, in a maintenance problem, enough information should be given to provide someone unfamiliar with maintenance enough understanding of maintenance to grasp its implications in the problem.

Part of the case-use objective is to encourage the student to recognize general relationships common to many situations. This recognition is based upon the students' experience in hard headed appraisals of facts and objectives in many different problems. On the other hand, generalities should be used only when they aid in understanding actual events. Much too often, people form conclusions based on generalities, with a lack of accurate facts or penetrating analysis.

## —How Would You Solve This One?—

The U.S. Air Force Band, a top level musical organization, is located at Bolling AFB in Washington, D.C. The organization is made up of three separate units: The Concert Band, the Drum and Bugle Corps, and the Dance Band. The Commanding Officer of the entire Air Force musical program is Colonel George S. Howard. Col. Howard works on the principal of giving his unit commanders in Washington full authority and responsibility and then backing them up to the maximum. He is interested in end results—if the unit commanders falter, he removes them.

In March of 1953, the Drum and Bugle Corps was International Interservice Champion. In that month, the Air Force Office of Public Information received a request from the Canadian Government to have the Drum Corps participate in a U.S.-Canadian Air Force joint program at the Canadian National Exposition at Ottawa in June. The Air Force was receptive to the request and extensive plans were made for the unit's trip. Takeoff from Bolling was set for 0630, 9 June. By noon of 8 June, seven Air Force Generals were in Canada and the Corps was set in every detail for its trip. The C-119's were loaded. A large program saluting

An important feature in case quality is recording underlying facts rather than general summarized conclusions. Relying on the writer's interpretation of facts produces a worthless case. The writer's function is to report accurately. His opinions should not be included in the case itself, but are often helpful to the instructor. When the writer reports opinions of participants in the problem, opinions should be labeled. (Example: Mr. Smith said "I think Jones failed.")

People are the main actors in most administrative problems. Their participation is essential in the case. However, skill is needed to convert people and their actions into words. A real danger exists in overplaying people—by writing into their actions the writer's preconceived notions.

Where disagreement exists between important persons—this frequently occurs in administrative problems—it is imperative to avoid remarks which sound like blackmail. It is easy to do this by using unemotional quotations. Rather than reflecting the most heated disagreements, remarks quoted should be completely cold and impersonal in the relationship between writer and other participants.

The writer must inventory his re-

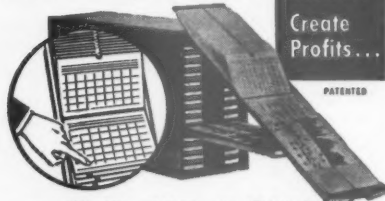
Canada and its Air Force was worked out in detail.

At 2000, 8 June, the Corps unit officer received a call from Mrs. Anna Rosenberg's office, requesting complete details on the activity. The officer was told to stay at his phone for later contact. At 2230, a call came from Mrs. Rosenberg's AF liaison officer stating that the U.S. State Department advised cancelling the activity. When asked why, the liaison officer said the Canadian musicians' union had contacted Petrillo—"They did not like the idea and would not be responsible for any unpleasant event that might occur." From 2240 until 0230, 9 June, the unit officer called the Pentagon, Canada, Petrillo in Chicago, etc., trying to get something definite. The Canadian brass couldn't be located, Petrillo refused to discuss the problem, and the lesser Washington officials would not commit themselves. Colonel Howard was in Europe.

The Drum Corps had a large part (1 hour and 50 minutes) of the program, scheduled to start at 1300, 9 June, in support of the U.S. salute to Canada. A minimum of 5 hours was needed to transport the unit and be ready to perform at Ottawa.

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sponsiveness to administrative matters. What one man considers technical data another considers administrative. A case which consists entirely of technical data on statistics or maintenance may not include enough administrative material. Some case writers purposely overload specialized material, with minimum administrative content, giving the student free reign to classify himself as a specialist or as an executive. Cases which grow lengthy (over 30 pages) are less useful in classroom. Extra material should not be allowed to defeat the purpose of the case, which is classroom discussion.

One generally accepted executive characteristic is an alert awareness of the environment in which they work. Developing this awareness requires that the writer incorporate the facts the student needs to exercise and expand his awareness. In working with this aspect of case preparation, it is helpful to divide the subject three ways: (1) executive climate, (2) environmental setting, and (3) dynamics vs. statics.

The executive climate in the organization where the problem arises can be blended in the problem by dwelling on relationships between executive personnel or by covering the viewpoints of one group of executives as opposed to that of another group. For example, the comptroller may see himself as the responsible financial executive who helps the rest of the staff with their funding needs. DCS/material may see himself as the logistical support expert. To the comptroller, DCS material may look like the guy who doesn't know that funds are limited and always wants more. To the chief of material, old moneybags is simply a tightwad bookkeeper. Viewpoints reflect climate. Facts underlying viewpoints help form the picture.

Environmental settings are the sense of the social, political, economic, military and religious pressures which hang over every executive action. Realizing that the time is right, understanding the impact his decisions will have on these pressures—these and other factors constitute the understanding of environment. A significant part of executive accomplishment can be attributed to environmental sensitivity—the ability to grasp the opportunity to make a fast buck painlessly. The timeliness of a problem, measured against its original background, reflects an environment that will condition thought in evaluating alternatives prior to the decision.

A thought to keep in mind is that executives work with active, moving situations. In accounting parlance,

they pay attention to operating reports as well as status reports. This qualitative case feature should focus attention on the action to be taken, on its dynamic impact, on the constantly changing situation in terms of the future—on mission accomplishment with emphasis on accomplishing.

Cases may be classified in many different types. From the classroom viewpoint, a variety of case types is desirable.

Perhaps the most common case is the issue-decision type in which rather clear cut alternatives face the student. The student must evaluate the problem and decide what to do. The buy or make decision, the expand or contract issue, the promote A or B situation are typical.

A slight modification of this type veils the real problem by including extraneous and technical material. Some additional value is gained by letting the student rely on his own resources to define the problem.

A different type of case is found in policy areas where the case is lengthy, often covering 5-15 years of organizational development, with no specific problem dominating the case history. Besides covering the mission, products, functional processes and record of technical and financial accomplishment, careful attention is given to the record of the chief executive and his immediate staff.

A third case type which has been found valuable in the classroom, is nothing more than an interesting sketch of an individual's job record over an extended period of time. In this case type, the individual's decisions and actions are shown in perspective with the environment where they occurred. While this type lacks the overall policy case viewpoint, or the dramatic decision of the issue type, it contains a pattern of events about a single person which give the student a chance to sharpen his depth insight. While other types of cases can be identified, the main need is to avoid a stereotyped approach to administrative selection for case preparation.

A careful study of case preparation has triple value. The most obvious is in case preparation itself, and the resulting educational benefits. Secondly, it is an excellent lesson in clear, organized thought, to be applied by the practical case-writer in everyday operations. Finally, the case study when it is well-written, serves as a prototype for a good report. Case study-type work, as witnessed by its world-wide acceptance, is valuable from many viewpoints, and well worth the time and study of virtually any executive.

ARMED FORCES MANAGEMENT



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Engineering Technician, GS-9-GS-12  
Engineer (Civil, Ceramics, Electr., Electrical, Mechanical, Structural, General, & Industrial), GS-9-GS-15  
Biologist (Applied Ecology), GS-9 & GS-11  
O & M Examiner, GS-9 & GS-11  
Training Specialist, GS-9 & GS-11

### Industrial Relations Officer U.S. Naval Avionics Facility Indianapolis 18, Indiana

Electronic Engineer, GS-9  
Electronic Engineer, GS-11  
Mechanical Engineer, GS-9  
Mechanical Engineer, GS-11  
Electrical Engineer, GS-9  
Electrical Engineer, GS-11  
Electronic Scientist, GS-9  
Electronic Scientist, GS-11  
Physicist, GS-9  
Physicist, GS-11

### U.S. Coast Guard Headquarters Washington, D.C.

Supervisory General Engineer, GS-14  
Electronics Engineer (Radio), GS-13

Supervisory General Engineer, GS-13  
Structural Engineer, GS-12  
Aeronautical Engineer, GS-12  
Supervisory Naval Architect, GS-12  
Electrical Engineer (General), GS-12  
Construction Management Engineer (General), GS-12  
Physicist (Optics), GS-12  
Structural Engineer (Floating Structures), GS-11  
Electrical Engineer (Marine), GS-11  
General Engineer (Marine Equipment), GS-11  
Electrical Engineer (General), GS-11  
Mechanical Engineer, GS-11  
Civil Engineer, GS-11  
Mechanical Engineer (General), GS-11  
Marine Engineer, GS-9  
General Engineer (Marine Equipment), GS-9

### 1st Coast Guard District Boston, Massachusetts

Structural Engineer, GS-11  
Civil Engineer, GS-9  
Electrical Engineer, GS-9

### 2nd Coast Guard District St. Louis, Missouri

Electronics Engineer (Radio), GS-9

### 3rd Coast Guard District New York, New York

Civil Engineer, GS-11

### 5th Coast Guard District Norfolk, Virginia

Electrical Engineer, GS-11  
Electronics Engineer (Radio), GS-9

### 7th Coast Guard District Miami, Florida

Electrical Engineer, GS-11

### 17th Coast Guard District Juneau, Alaska

Supervisory Architect (General), GS-12  
Marine Engineer, GS-11 or GS-9

Electrical Engineer, GS-11  
Structural Engineer, GS-11

### 8th Coast Guard District New Orleans, Louisiana

Civil Engineer, GS-9

### 12th Coast Guard District San Francisco, California

Architectural Engineer, GS-11

### 13th Coast Guard District Seattle, Washington

Mechanical Engineer (General), GS-9

### Washington Radio Station Alexandria, Virginia

Electronics Engineer (Radio), GS-9  
Maintenance Engineer, GS-9

### Industrial Relations Department U.S. Naval Torpedo Station Keyport, Washington

Physical Metallurgist, GS-11  
Electronic Engineer, GS-11  
General Engineer, GS-11  
Mechanical Engineer (Ordnance), GS-11

### District Public Works Office, Sixth Naval District U.S. Naval Base, Charleston, S.C.

Industrial Engineer, GS-11

### Rossford Ordnance Depot Toledo 1, Ohio

Mechanical Engineer, GS-9  
Analytical Statistician, GS-9

### Headquarters Middletown Air Material Area Olmsted AFB, Penn.

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Age \_\_\_\_\_ ☐ Single ☐ Married ☐ Male ☐ Female

Rank, grade or occupation \_\_\_\_\_

Location of Car (if different from residence address) \_\_\_\_\_

Car is registered in State of \_\_\_\_\_

Yr. Make Model (Dix., etc.) Cyl. Body Style Purchase Date ☐ New ☐ Used

1. (a) Days per week car is driven to work? \_\_\_\_\_ One way distance is \_\_\_\_\_ miles.

(b) Is car used in any occupation or business? (Excluding to and from work) ☐ Yes ☐ No

2. Additional operators under age 25 in household at present time:

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# Developing Team-Work In Technical Publication Management

Ninth In A Series

by Roswell Ward

Technical Publication Management  
Consultant

**T**HIS article covers two subjects which normally require more complete coverage, but it is possible to present essential data in a way which ties in closely with various aspects of publication management discussed in the previous articles of this series. The subjects presented are:

1. Methods of working with graphic arts specialists, including technical illustrators and other specialized types of artists and draftsmen, technical or industrial photographers, photographic retouchers, layout artists and typographers, and various types of printers if the job requires complete printing and binding of the publication in question.

2. A study (including hitherto un-

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published information) of the whole problem of the selection and evaluation of technical writing services, who may or may not take on responsibility for all graphic arts work including illustrations, typography, and supervision of printing if necessary. Closely related to this problem is the relationship with other specialized vendors, technical illustrating services, typographers, etc.

One of the most interesting and important aspects of a writer's work on technical publications, whether for military or civilian readership, is thinking up ideas for the illustrations which play an essential part in graphically interpreting the text. Good illustrations are essential to any type of technical information publication or presentation and in many cases the text becomes virtually an expanded series of captions for the illustrations. In working up initial ideas for illustrations the writer may be the essential creative influence in developing illustrations. At the least he must play his part in developing team-work between himself and engineers and field service personnel and the photographers and illustrators who can assist in contributing ideas for illustrations of all types and transforming these ideas into reality.

It is for this reason that technical writers should not operate in a watertight compartment cut-off from photographers and illustrators. In some organizations a writer must, upon the completion of a manuscript, pass it on, with appropriate recommendations, to a section editor, then to an editor-in-chief, then to a publication production manager who will transmit illustration requirements to a chief illustrator or chief draftsman, and to a chief photographer.

However there is nothing in specifications or budget requirements which prevents the direct contact of the writer—as the initial center of creative imagination and creative leadership—with photographers and illustrators if a manufacturer really wants to produce technical publications of high quality. There is unquestionably a marked trend, in both military and civilian top management, towards requiring higher and higher standards for technical literature. The team-work outlined above can contribute greatly towards this objective.

Within this article it is not possible to outline the wide variety of tech-

nical illustrations which are available. Some technical illustration is based on photographs which may or may not require expert retouching and which must be planned to bring out certain details or operating characteristics of the equipment or service being described. In this respect the photographic craftsmanship of the photographer can contribute greatly and it is for this reason that the term "technical photographer" is recommended as more specifically indicating the skills needed to work with technical writers and technical illustrators than the broader and often mis-used term "industrial photographer." The experienced technical illustrator may be adept at product retouching, an operation quite different from routine photographic retouching. He may develop layouts and paste-ups, based on photographs, to display captions, parts identifications or the legends known as "call-outs" in some specifications. Some technical illustrators, working from blueprints, develop perspective line drawings used for exploded views in parts lists, or more elaborate perspective drawings which, when completed with air brush rendering, are used as sectional or cut-away drawings.

In some technical publications freer illustration or a cartoon technique, like the well known renditions of the comic Air Force character known as "Dilbert" in World War II is used. Dilbert effectively demonstrated how to-do-everything-wrong and as such was an attention-compelling and effective training medium—a real tribute to the imagination of cartoonist "Osborne" who originated this character and to the Air Force executives who adopted him. At present Air Force sources report that both cartoons and "leg art" are mainly used in combat pilots flight manuals as it is believed to be the best way to attract the attention of these carefully selected and highly trained officers. We can assume that more of this technique will be used in both military and civilian instruction books and more general types of training manuals.

The steps recommended in selecting a technical writing service to prepare instruction books for manufacturer of military or civilian equipment, or to deal with other types of technical publication problems, are as follows:

1. Through independent channels

ARMED FORCES MANAGEMENT

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obtain data on how effectively they have worked for various previous clients.

2. Obtain as complete a roster as possible of technical writing personnel with their experience and length of service indicated and ask for information on turn-over in writer personnel, experience in obtaining acceptance of manuscripts by procurement agencies (if on armed forces jobs), financial responsibility, whether illustrating work is farmed out to other services, and security rating if the job is classified.

3. Once a job estimate is accepted by the manufacturer, a contract should be executed which stipulates that experienced writers will be continuously assigned to the job (including selected writers with previous experience of the manufacturer's products and publication projects if they are available); specifies that the writing service personnel will travel to the manufacturer's plant or office to maintain contact with the job; and outlines methods of payment on approval of first draft of manuscript and on completion of the job. On some types of jobs, the usual payment of 50% on approval of first draft and 50% on completion may be unfair as the work on first draft may take at least 80% of the time required for the job, most of the expenditure

being labor cost.

It can fairly be stated that poor judgment, in evaluating technical writing service quotations, and in detecting poor technical and/or ethical practices can often stem from the delegation of such purchasing relationships to contract administrators or purchasing agents who are not as familiar with detecting the "tricks of the trade" as experienced publication managers. It is also probable that such inexperienced handling of relations with unethical technical writing services is costing the armed forces and industry considerable amounts of money, lost time, and waste motion generally.

In this respect it should be reiterated that there are many responsible and highly efficient technical writing services and technical illustrating services who never pay gratuities of any type, in money or in more than nominal entertainment, and who do an outstanding job for military and civilian clients. Efforts have been made to establish a trade association of such services, with a rigid code of ethics,

but so far no announcements of such an organization have been made. It is to be hoped that manufacturers, ethical services, and procurement agencies will issue more data on specimen contracts, and other methods of controlling and supervising relationships with these "outside vendors."

In working with a technical writing service there is no reason why there cannot be a high degree of team work between engineers, publication executives, and the service's technical writers and illustrators, *providing* that the service personnel spend enough time in the client's plant to establish good working relationships and operate with personnel who can constructively carry on such relationships. It is obvious that whether writing and graphic arts work is done entirely by a manufacturer's own organization, or whether all or part of it is farmed-out, the important essential to real achievement in preparing effective technical publications is a good writer-photographer-illustrator team-work type of creative collaboration.

This article is the ninth in a series on technical publication management. A collected edition of reprints of the ten-article series (with some material added) will be available in January, 1959. For information address: Roswell Ward, Technical Publication Management Consultant, Rockledge, Bantam, Connecticut.



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## Personnel Preview

### Two Navy Civilians Receive High Awards

Two civilian employees of Department of the Navy have received the Distinguished Civilian Service Award, Navy's top civilian honor. Recipients were Lynwood Cosby, an electronic scientist at Naval Research Laboratory, and Dr. Waldo K. Lyon, Director of the Submarine and Arctic Research Branch at U.S. Navy Electronics Laboratory.

Cosby was honored for a "major breakthrough" in electronics countermeasures, and Dr. Lyon was honored for "exceptionally distinguished service as principal scientific advisor to the Department of the Navy in connection with the planning and execution of the outstanding cruise of the Nautilus" under the Polar ice cap.

### Fifteen Committees Eliminated by DOD

A further step in the in-house half of Pentagon reorganization was accomplished last month by eliminating fifteen DOD committees. The most recent step in defense overhaul did not require Congressional approval, but was a follow-on to McElroy's warning that committees in DOD either justify themselves or get out of business.

Eliminated in DOD Transmittal 58-37 were Supply and Logistics Task Group, Emergency Planning Committee; Properties and Installation Task Group, Emergency Planning Committee; Health and Medical Task Group, Emergency Planning Committee; Civil

Defense Task Group, DOD Emergency Planning Responsibilities; Manpower Task Group, Emergency Planning Responsibilities; and Relocation Task Group, DOD Emergency Planning Committee.

Also, Wartime Organization Task Group, DOD Emergency Planning Committee; Joint Committee on Military Pay Procedure; Establishment of DOD Declassification Policy Committee; Joint Aircraft Committee; DOD Materiel Secretaries Council; Research and Engineering Coordinating Committee on Maintenance Engineering; Critical Materials Conservation Committee; Research and Engineering Coordinating Committee on Biological and Chemical Warfare, and Committee on Standardization of Medical Forms.

### Trainfire Range Opens at Ft. Ord

The bullseye and the KD range were pushed down the first step to obsolescence last month, as the first Army Trainfire rifle range was officially opened at Army's Fort Ord, Calif. Infantry Training Center.

Eight of the total 14 planned Trainfire ranges at Fort Ord are now in use by Infantry troops stationed there. The aim of the Trainfire range is to simulate battlefield conditions as closely as possible, create additional troop interest in marksmanship.

Silhouette targets on the Trainfire range automatically fall with impact of the rifleman's shot. These targets are electrically controlled from a tower



Fort Ord troops fire Trainfire ranges from four-foot foxholes.

behind the firing line, and are designed to give the firer the feel both of combat conditions and actual "killing."

In addition to the electrically controlled targets, the Trainfire ranges have firing lines designed for realism. Because most actual combat firing is done from a covered position, the Trainfire firing lines are composed of foxholes four feet deep.

Trainfire will be the standard method of training basic rifle trainees at Fort Ord. Trainfire is an outgrowth of studies of the Infantry Human Relations Center at Fort Benning, Ga.

### Aviation Cadet Plan Announced by Marines

Marine Corps has announced plans to begin its own Aviation Cadet Program, beginning in July, 1959. In the past, many Marine pilots were trained through the Naval Aviation Program.

Present plans call for an initial class of 11 Cadets to begin training on July 6, with a total 307 Marines to be phased in during the first year of operation. Training during the 18-month course will be identical with that given to Naval Aviation Cadets.

### Safety to be Reviewed At Air Defense Sites

Secretary of the Army Wilbur Brucker has appointed a Committee on Safeguards, to review safety measures at Army Air Defense sites.

After a meeting early last month, the group inspected and received briefings at Field Command, Armed Forces Special Weapons Project, U.S. Army Air Defense Command and the Davidsonville, Md. Nike-Hercules site. Chairman of the group is Clifford F. Hood, president of U.S. Steel Corp.

ARMED FORCES MANAGEMENT



Conferees explore applicability of advanced mathematical techniques in solving inventory management problems at recent meeting sponsored by Army's Office of Ordnance Research, Durham, N.C. Session was part of Ordnance Corps Inventory Management Project.

## Dates to Circle

### November 10-12

International Conference, School of Aviation Medicine—San Antonio, Tex.

### November 11-14

19th Annual Convention, National Aviation Trades Assoc.—Pfister Hotel, Milwaukee, Wis.

### November 13-14

Symposium on Molecular Electronics, National Security Industrial Assoc.—Washington, D.C.

### November 16-21

International Conference on Scientific Information—Washington, D. C.

### November 17-18

American Society for Quality Control, 6th Annual Aircraft and Missile Div. Conference—Biltmore Hotel, Dayton, Ohio.

### November 5-7

22nd Annual Industrial Engineering and Management Clinic—Hotel Sheraton, Chicago; sponsored by the Industrial Management Society.

### November 17-21

American Rocket Society, 13th Annual Meeting—Statler Hotel, New York.

### November 19-21

Aviation Distributors and Manufacturers Assoc., 32nd Meeting—Dallas, Tex.

### November 19-21

Equipment Systems Conference—Conference Bldg., Balboa Park, San Diego, Cal., sponsored by 11th Naval District in cooperation with various industrial associations.

### November 21-22

Third symposium on magnetohydrodynamics—Lockheed Missile Systems division's Palo Alto, Cal., research laboratory, sponsored by private industry.

### November 28-December 4

National Physical Laboratory Symposium and Electronic Computer Exhibition—London, England.

### January 12-14, 1959

Fifth National Symposium on Reliability and Quality Control—Philadelphia, Pa.

### February 3-5

Fourteenth Annual Technical and Management Conference—Chicago, Ill.; sponsored by Reinforced Plastics div. of the Society of the Plastics Industry, Inc.

NOVEMBER 1958

## Shift in Key Personnel

### ARMY

Dr. Harold C. Weber, Massachusetts Institute of Technology, named Chief Scientific Advisor Consultant to the Army's Chief of Research and Development.

Brig. Gen. Roy N. Walker, Adjutant General, Eighth U.S. Army, to U.S. Army Element of the Recruiting Publicity Center, this month.

Brig. Gen. Creighton W. Abrams, Jr., Deputy Assistant Chief of Staff for Reserve Components, to U.S. Army, Europe.

Brig. Gen. Frederick T. Voorhees, Transportation Officer, Eighth U.S. Army, to the Office of the Chief of Army Transportation, this month.

Maj. Gen. Robert V. Lee, Deputy Adjutant General of the Army to Adjutant General.

Brig. Gen. Bruce Easley, Chief of the Personnel Division, Office of the Army Adjutant General to Deputy to the Adjutant General.

Brig. Gen. Robert N. Tyson, Comptroller of the Eighth Army, to Office, Comptroller of the Army, in February 1959.

Brig. Gen. Augustus G. Elegar, Chief of Staff, I U.S. Army Corps, to the U.S. Army Training Center, Fort Ord, Calif., in December.

Brig. Gen. Gunnar C. Carlson, Deputy Chief for Logistics and Administration, Military Assistance Advisory Group, Vietnam, to the Office of the Army Ordnance, Washington, D.C. in January 1959.

### NAVY

RAdm. Harold M. Briggs, previously ordered from Commander, Middle East Force, to Bureau of Naval Personnel, will report as Director, Pan American Affairs & U.S. Naval Mission Division, Office of the Chief of Naval Operations.

RAdm. Thurston B. Clark from Commander Naval Air Test Center, Patuxent River to District Medical Officer, Fifth Naval District.

RAdm. Almon E. Loomis from Commander, Carrier Division Seventeen, to Deputy Chief of Naval Personnel and Assistant Chief of the Bureau of Naval Personnel.

RAdm. Raymond N. Sharp from Commander, Carrier Division Fifteen to Office of the Chief of Naval Operations.

RAdm. Frank O'Beirne from Office of Chief of Naval Operations to Director, Operations, Joint Staff, Joint Chiefs of Staff.

RAdm. Edward A. Hannegan from Commander, Carrier Division Fourteen to Commander, Naval Air Test Center, Patuxent River, in December.

RAdm. Allan L. Reed, from Office of the Chief of Naval Operations to Deputy Director of Naval Intelligence, Naval Operations.

RAdm. John W. Ailes, III, Director, Shore Establishment Development and Maintenance Division, Naval Operations, to Naval Inspector General, Navy Department.

RAdm. David M. Tyree, Commander, Task Group 7.3 and Deputy for the Navy, Joint Task Force, to Office of the Chief of Naval Operations this month.

RAdm. M. K. Mendenhall replaces RAdm. Harold D. Baker as Commandant, Potomac River Naval Command.

### AIR FORCE

Maj. Gen. John B. Cary from Director of Plans, DCS Plans & Programs, Hq. USAF to Deputy Chief of Staff, Plans & Operations, Hq. Pacific Air Force.

Maj. Gen. Robert O. Cork from Asst. Comptroller of Air Force to Deputy Chief of Staff, Administration and Logistics, Hq. Pacific Air Force.

Brig. Gen. W. A. Davis from Dep. Dir. Weapons Systems to Production, Directorate of Procurement and Production, Hq. Air Materiel Command. (For other officer changes in AMC headquarters, see pp. 30-31.)

Maj. Gen. Charles B. Dougher from Dep. Cmdr., 8th Air Force, SAC to Chief, Air Technical Intelligence Center, Wright-Patterson AFB, Ohio, in December.

Maj. Gen. Richard M. Montgomery from Dep. Cmdr., 2nd Air Force, SAC to Cmdr., Hq. 3rd Air Div., SAC.

Maj. Gen. O. K. Niess from Command Surgeon, Pacific Air Force to The Surgeon General, USAF, Hq., USAF.

Maj. Gen. Charles W. Schott from Cmdr., 3rd Air Div., SAC to Dep. Cmdr., 2nd Air Force, SAC, Barksdale AFB, La.

Max Golden appointed General Counsel, Department of the AF from Dep. Asst. Secy. of the Air Force (Materiel).



# Newsletter

Armed Forces Management Association  
OTis 4-7193

Room 3D937, The Pentagon, Washington 25, D. C.  
National President: Rawlings S. Poole  
Executive Director: VAdm. Harry E. Sears, USN, ret.

*AFMA Newsletter is issued monthly by the Armed Forces Management Association through the cooperation of Armed Forces Management magazine to inform the membership and AFM subscribers of the aims, projected programs and current activities of the Association.*

**Reaction to AFMA Newsletter**, initiated with October issue of ARMED FORCES MANAGEMENT, encouraging. Sampling of the membership indicates this to be a very popular feature of AFMA's expanded program.

**Review of AFMA program**, following outline of Association's aims and objectives presented in last issue of AFM pertinent at this time and includes:

#### Objective:

- Provide means for the exchange of management knowledge, methods and techniques among the various elements of the defense establishment.

#### Program:

- AFM Magazine. Contributions to this medium in the form of articles covering all facets of defense activity are encouraged.
- AFMA Quarterly Journal. Same. Circulation of these media to key defense officials and their staffs on a world-wide basis is now being accomplished.
- Annual National Conference.
- Management Seminars on a regional and local basis.
- Guest speakers, round table discussions and work shop projects at the chapter level.

#### Objective:

- Provide means for the exchange of management knowledge, methods and technique between industry, educational institutions and the defense establishment.

#### Program:

- The Annual National Conference.
- Management Seminars on a regional and local basis.
- Guest speaker, round table discussions and work shop projects at the chapter level. Corporate membership provides industry representatives in chapter activities.
- Liaison with other management organizations.
- AFM Magazine and AFMA Journal.

#### Objective:

- Encouraging individual and collective efforts for improving management in the defense establishment.

#### Program:

- Submission of articles on defense operations and management problems to the media listed above.
- Outstanding Chapter and Individual Awards.

- Student theses on management.

#### Ultimate goal:

**To establish AFMA** as the foremost forum of defense management knowledge in the world, with a large and widespread membership, knowledgeable in all aspects of defense management and dedicated to its continuing improvement.

**Four new chapters** are in the process of forming at CONARC, Little Rock, Great Lakes, Spain. Many inquiries from other command areas and major installations.

**Corporate memberships** up 200%. AFMA is honored to welcome to its expanding family of corporate members Aeroneutronics Systems of Ford Motor, Diebold, Chance Vought Aircraft, Soundsciber Sales, Thomas A. Edison Industries, Aerojet General and Bell Aircraft.

**Administrative housecleaning** making good progress. All forms, pamphlets, brochures and kits are being reviewed and revised as necessary.

**Constitution and by-laws** revised to keep pace with the times and the expanded activity of AFMA, will be submitted soon to the membership for approval.

## CHAPTER BRIEFS:

- **WRIGHT BROTHERS Chapter**, Wright-Patterson AFB, Ohio, has submitted a tentative program for the year. This excellent guide is being distributed to all chapters to assist them in forming program plans.

- A Chapter Program Manual is being developed at National Headquarters to assist in chapter administration and programming.

- Membership certificates from National HQ will now bear the same date as application received from chapter to help the latter's bookkeeping. This suggestion from DETROIT Chapter, whose treasurer visited AFMA HQ recently.

- The importance of multi-service participation in local chapter activities cannot be over-emphasized. If a principal objective of AFMA is the exchange of management knowledge among the elements of DOD is to be realized. Include industry representatives to complete the picture.

- Administrative note. Be sure to include prospective members' rank of grade on application form. Important.

- National Conference planning now in full swing. Response from industry co-sponsors and exhibitors has been excellent. Increased exhibit space in three separate locations will be used for this conference. Remember the dates: May 26-28, 1959.

**Every Member Get a Member—  
or Several**

For further information on individual or corporate membership in the association, circle number 200 on business reply card (p. 49).

ARMED FORCES MANAGEMENT



## Fort Benning Chapter Hears Hospital CO

Hospital Management was the topic of a talk by Col. Robert B. Skinner, commander of Martin Army Hospital, at the recent monthly dinner meeting of the Fort Benning Chapter of Armed Forces Management Association.

AFMA members and guests attending the meeting assembled at the clinic entrance of Martin Hospital for a guided tour of the hospital. Following this, the Chapter met in the hospital mess hall for the dinner meeting.

## Aberdeen AFMA Group Hears DOD Official

Fletcher D. Mitchell, Jr., Deputy Assistant Comptroller of the Army for Systems Development, was guest speaker at a regular dinner meeting of Armed Forces Management Association at Aberdeen Proving Ground.

Mitchell, a career government em-



Maj. Gen. H. N. Toftoy

ployee who has served in various agencies of the Defense Department, was introduced by George O. Dragon, president of the APG Chapter.

Mitchell spoke on financial management in the Army and outlined principles of the Army management system.

Special guests at the dinner meeting included Maj. Gen. H. N. Toftoy, Aberdeen Commanding General; Brig. Gen. George W. White, Aberdeen Ordnance Training Command Commanding General; Col. G. F. Powell, deputy commander; Col. Frank Swoger, executive officer; Olin O. Taylor, special assistant to the commanding general, and Vice Adm. Harry E. Sears, USN ret., AFMA executive director.

Representing industry at the meeting were Russell Henderson, UNIVAC Div., Sperry-Rand Corp., and Paul Lane and John Bennett, Burroughs Corp.

In a brief address to the group, Gen. Toftoy welcomed the guests and national officials of AFMA to the Proving Ground. He indicated his interest in such groups, and noted he was glad to have an AFMA Chapter at Aberdeen.

One hundred and four persons attended the chapter meeting.

## AFIT Business School Scholastically Honored

The American Association of Collegiate Schools of Business has invited to membership the School of Business of the Air Force Institute of Technology.

This means that graduates of the AFIT Comptrollership Course, who have met all other Business School requirements, will be eligible for Masters Degrees in Business Administration.

The accreditation came after a thorough evaluation of the existing graduate program, the facilities and the faculty. The School of Business is now one of the few in the nation whose program is entirely graduate.

## Hawaii AFMA Chapter Hears Brig. Gen. Preuss

Solutions to personal management problems were the subject of a talk given by Brig. Gen. Paul T. Preuss, Commander of Pacific Air Forces Base Command, to the Hawaii AFMA monthly luncheon, held recently at Hickam Officers' Club.

Gen. Preuss followed Honolulu Mayor Neil S. Blaisdell, who spoke on municipal management problems.

Gen. Preuss, who has been in the nuclear weapons field for the past 11 years, said that "careful handling of high-value munitions that demand 100% reliability was a primary management problem," at Sandia AFB, N.M. "The recognized tools of management were used in varying degrees and one of the more effective tools was competition. Competition among units engaged in similar work was emphasized."

He also said that a demerit system similar to those used in trade and military training schools was used. "A burred screw head rated one demerit; a loose electrical connection, 10 demerits, and so forth. This developed the keenest kind of competition," he said.

More than 85 civilian and military management specialists attended the luncheon, which is held at different Hawaii military installation each month.

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# Are Beneficial Suggestions Really Beneficial?

by 1st Lt. Alan Samuels  
Adjutant General's School, U. S. Army

**T**O many, the Incentive Awards Program appears to be an ineffective and inappropriate gimmick to glamorize the Army by forcing false similarity to big business.

An enterprise concerned with maintaining a highly trained, disciplined combat force, these people feel, does not lend itself to a program in which those men, and their leaders, are encouraged to submit management improvement ideas. Even the word "management" is strange to these people, who have been taught LEADERSHIP.

Aside from these nebulous ideas, physical contact with the Incentive Awards Program gives this thought—the Investigating Officer is charged with finding all issues causing a suggestion, and with evaluating all ramifications which would follow its adoption. As a result, he often spends more time investigating suggestions than he does in his normal duties. This is especially true when suggestions border, or fall into the realm of inanity. An important aspect of the Program is that reasons behind rejection of each suggested idea be explained.

"The Incentive Awards Program is directed toward achieving wider participation by personnel at all levels in the solution of management problems and toward increasing productivity, by providing suitable awards and recognition therefor." Beginning with this clear policy statement, the regulation forming the Incentive Program (AR 672-301) goes on to outline the program, its aims and its incentives.

Any action which saves the Army and the government time and expense, while not detracting from its mission (better still, aiding mission accomplishment), is inherently valid. Solving management problems and increasing

productivity go a long way toward this goal. Therefore, the program objectives are valid.

The Incentive Program has shown definite drive toward these goals. A program evaluation at U.S. Army Administration Center, Far East, shows the following results:

In 1956, little was done toward accomplishing program goals. A small number of suggestions were submitted, acted upon and used. Estimated one year money savings in man-hours/material were just over \$1,000. As small as response and savings were, it was a start toward the objective.

The results in 1957 give a more accurate picture of what the program can do. With increased command emphasis on Incentive Awards, the number of suggestions submitted was up 70% over the year before, and there was a 97% increase in adopted ideas. Estimated savings for the year were \$39,400.

The most obvious cost is award money. This is a negligible expense. The cost of certificates and letters for contributors is also small, even when compared to cash awards.

Man-hours involved in investigating suggestions and administering the program are by far the greatest expense. Investigation is, and should be, handled by supervisors. Their primary responsibilities are solving management problems and insuring maximum productivity. The program does not needlessly increase work, but serves to direct the supervisor's attention toward his primary mission. This should not be charged as additional cost, but more appropriately considered a benefit.

Suggestion consideration by an Incentive Awards Committee is often time-consuming. This time can rightly

be charged to the program. But because the committee is composed of division chiefs—supervisory managers themselves—there are other beneficial by-products. Exchange of ideas on management problems is stimulated, resulting in overall improvement of techniques.

The only expense justly charged to the Incentive Awards Program alone is the committee Executive Secretary's time. The secretary must forward suggestions to investigators, maintain a suggestion log, prepare committee agendas, and reply to suggestors. This expense is negated. The money saved by any one of three suggestions submitted at U.S. Army Administration Center, Far East, in 1957 could have paid for the Secretary's time.

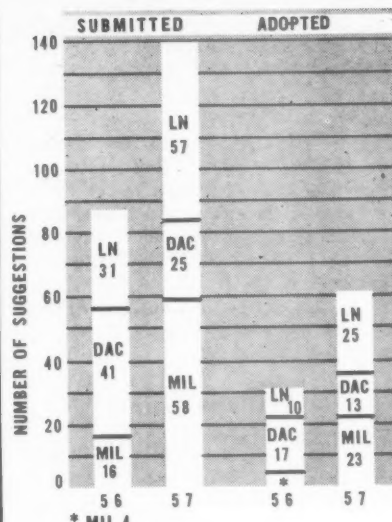
Many suggestions reap benefits which can not be evaluated in cash terms. Twenty-four of those adopted at USAAC in 1956, and forty-two in 1957 fell in this category. But these suggestions will result in better work quality through better working conditions and techniques.

If the results at this installation are the same throughout the Army, then definite benefits have resulted from the program. "Wider participation by personnel at all levels in the solution of management problems and toward increasing productivity" has been gained.

"Providing suitable awards and recognition" is the rub. The program provides cash awards to civilian personnel. But military personnel, (except special in command-wide suggestion contests), are restricted to awards ranging from the Suggestion Award Certificate to the Commendation Ribbon. This inequity would seem to deter many soldiers from taking part in the program.

In practice, this is not the case. The number of military contributions is significant, and the resulting benefits are great. The largest single tangible saving at USAAC resulted from a Master Sergeant's suggestion. Perhaps the apparent difference does not disturb the career soldier, for his motive for staying in the service is not money, but patriotic service.

While an Incentive Award Program may not be suited to a combat organization, the "business-type" Army activities are fertile ground for improving supervisory management. It has been said that "The American soldier . . . properly equipped, trained and led . . . has no superior among all the armies in the world." If we can save money in support activities, and give better service to the troops, the American soldier will receive better equipment, better training, and better leaders.



# Your Investment Future

## Is Your Question Here?

by W. Mac Stewart\*

A year ago we answered a number of readers' questions in this column. Since then there have been hundreds of other queries, most of them answered personally by mail. Here are some of the questions asked frequently in the past few months.

**Q. Are share prices of mutual funds too high?**

A. Definitely not. A few years ago when good steak sold for 60¢ a pound, many people thought it was "too high" because they compared it with the days when it sold for 45¢ or 50¢. Thus the comparison "too high" is usually with prices in the past. With steak now at \$1.25 per pound the 60¢ price of a few years ago appears as a real bargain. It is the same with investments. When you buy mutual fund shares you're thinking of the years ahead, not behind. And in the future, it will be proved that today's share prices are real bargains.

**Q. Is the recession definitely over?**

A. Yes. The typical cyclical pattern of recovery is well under way. The rate of recovery to date has been quite rapid. The recovery will continue, but probably not as rapidly from this point on. Plans for capital expenditures by the nation's leading industries reveal modest increases over previously-announced plans. It is interesting to note that the belt tightening by industry during the slack period has resulted in industry coming out of this recession a great deal more efficient than it was only 18 months ago.

**Q. Is it true that mutual funds have paid lower securities profits (long term capital gains) dividends in the past three quarters than previously?**

A. It is true of most, but not all, common stock funds. During the first half of 1957 the market was in an upward trend, so many fund managers wisely took capital gains profits for their investors. However, the second half of 1957 and the first half of 1958 were marked by a downward trend and a sideways movement of the market, providing less opportunity for profit-taking. However, the stocks of certain industries did very well price-wise during this recession. Funds having good representation in those industries were able to capture profits, and thus pay capital gains dividends commensurate with amounts paid the

previous year. However, such funds were the exception, rather than the rule.

The rising trend of the market since June of this year is an encouraging sign as far as future capital gains dividends are concerned.

**Q. At the rate mutual funds are growing, won't they soon run out of high grade common stocks to buy, or else drive the prices of these stocks up too high?**

A. This is most unlikely. Remember, mutual funds are only a small part of the institutional demand for common stocks. Trust funds, pension funds, large endowment and charity funds, insurance companies, and large private fortunes total much more than mutual funds. So the demand for good common stocks comes from many sources. Obviously, as these institutional investors increase their purchases of high grade stocks, the floating supply of these stocks is reduced. But on the other hand, if the prices of these stocks increase to a point where the yield is too low, institutional investors look elsewhere for higher yield, thus bringing the stock prices back down to a more favorable price-yield ratio. Other factors that increase supply of shares are: (1) From time to time the blue chip companies issue additional shares to raise new capital, or may issue stock dividends or have stock splits. (2) Many of today's "light blue" chip stocks will become the real blue chips of tomorrow, creating a reservoir of additional shares to attract institutional investors.

**Q. I hear mutual funds referred to as an "inflation hedge." Why is this?**

A. This is only partially true. Not all funds can be considered a hedge against inflation. The point here is that common stock is a protection against loss of purchasing power of your money, caused by inflation. Therefore, a mutual fund having all or a major part of its funds invested in common stocks is an inflation hedge. However, some mutual funds have a preponderance of their capital invested in preferred stock and/or bonds. This type of fund offers a high

As a service to our readers, Financial Editor W. Mac Stewart will be glad to answer readers' investment questions by mail. Address Inquiries to Mr. W. Mac Stewart, Hamilton Management Corp., P. O. Box 5061, Denver 17, Colorado.

\*Vice President—Research.  
Hamilton Management Corporation

NOVEMBER 1958

degree of capital safety, with assured income, but offers little opportunity for your capital to grow. Therefore, during an inflationary period such funds return dollars for dollars, but the share values are not apt to rise in value enough to keep up with the inflationary spiral.



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## Rundown of Key Contracts

### ARMY

- \$14 million to Douglas Aircraft Co., Inc. for Nike field change kits, repair parts, adaption kits and related items.
- \$1.5 million to Telecomputing Corp. for 384 warhead testers.
- \$2.1 million to North American Aviation Co. in connection with the Jupiter missile program.
- \$2.0 million to Raytheon Manufacturing Co. for repair parts for Hawk missiles.
- \$4.8 million to Chrysler Corp. in connection with the Jupiter missile program.
- \$1.3 million to Western Electric Co. for repair parts for the Nike-Hercules.
- \$8.7 million to The Martin Co. on the Pershing missile weapons system.
- \$2.7 million to Ford Instrument Div., Sperry Rand Corp. for guidance and control components for the Jupiter missile.
- \$25.2 million to Republic Aviation Corp. for 20 Swallow low-endurance combat surveillance drones.

### NAVY

- \$3 million in two contracts to Interstate Electronics Corp. for test and evaluation equipment for the Polaris fleet ballistic missile program.
- \$1 million to General Electric Co. for constant speed drives for A4D-½ aircraft.
- \$7.7 million to Lockheed Aircraft Corp., Georgia Div., for model GV-1 airplanes.
- \$26.5 million to Douglas Aircraft Co., Inc. for A3D-2 aircraft.
- \$2.1 million to Kollsman Instrument Corp. for periscopic sextants.
- \$10.4 million to Lockheed Aircraft Corp., California Div. for reproduction engineering data for P3V-1 aircraft.
- \$1.7 million to United Aircraft Corp., Pratt & Whitney Div. for development testing of T34 engine, turbine inlet probes, dual accessory gear box and maintenance.
- \$20 million-plus to Ryan Aeronautical Co. to produce automatic radar navigation equipment for Navy aircraft.

### AIR FORCE

- \$10 million follow-on contract to Kaman Aircraft Co. for 54 H-43B air base, crash rescue helicopters.
- \$16 million to Republic Aviation Corp. for advanced follow-on orders of the F-105.
- \$1.5 million to Hughes Aircraft Co. for modification kits and components for F3H-2N radar sets.
- \$18.7 million to Laboratory for Electronics, Inc. for Doppler radar system spare parts, ground support equipment, training parts, flight test and data to be used with the F3H-2N aircraft.
- \$5.8 million to The Heil Co. for aircraft refueler type truck tank with high wing refueling kit.
- \$15.6 million to Hughes Aircraft Co. for repair/modification of Hughes-designed fire control systems.
- \$2.2 million to International Business Machines Corp. for repair/modification of bombing-navigation systems.
- \$1.4 million to Marquardt Aircraft Co. for qualifications tooling for RJ43 ramjet engine in support of Bomarc missile.
- \$1.9 million to Allison Div., General Motors Corp. for T56 turboprop engines for C-130-B aircraft.
- \$1.2 million to Small Aircraft Engine Dept., General Electric Co. for T58 engines and related equipment for HSS-1 helicopters.
- \$3 million to Radio Corp. of America for development of high-temperature devices employing new semi-conductor materials.
- \$6 million to Republic Aviation Corp. for aft sections and ailerons for F-105 aircraft.
- \$3.4 million to Kollsman Instrument Corp. for astro compasses.
- \$6.4 million to Republic Aviation Corp. for implementation of the F-105 program.
- \$3.7 million to Crosley Division, Avco Mfg. Co. for fire control system, bomber tail defense for B-52s.
- \$8 million to Burroughs Corp. for research and development on digital computer systems for the Atlas ICBM.
- \$20 million to Northrop Aircraft, Inc. for additional procurement of Snark long range guided missiles, spare parts and technical handbooks.

ARMED FORCES MANAGEMENT

# New Products

## Lead Items This Month

(For more information, see advertisers' index)

### Inventory Control

**Wassell Organization, Inc.** Lists 16 reasons why you should be cutting costs and speeding efficiency with the simplified inventory control, Sig-na-lok. Visible control puts inventory at your fingertips.

For more facts request No. 3 on reply card.

### Boardmaster Control

**Graphic Systems.** This firm reports men interested in efficient management can get things done with Boardmaster Visual control which gives a graphic picture of operations, spotlighted in color, saves time, money, and stops errors.

For more facts request No. 4 on reply card.

### Visual Control Board

**Wassell Organization, Inc.** Pro-duc-trol not only schedules but automatically checks with time, line, and color control, has low original and up-keep cost.

For more facts request No. 9 on reply card.

### Steel Shelving

**Equipto.** Complete reference manual No. 485 describes Equipto "Iron-Grip" steel shelving. Exclusive steel stud, it is claimed, permits 60% faster shelf adjustment without nuts, bolts or tools. More shelf is loaded, tighter it grips, yet shelf can be moved easily.

For more facts request No. 7 on reply card.

### Management Guide

**Wassell Organization, Inc.** Every management executive concerned with defense production will want a copy of this new 40-page book of ideas for greater productivity at lower cost—just issued by the makers of Pro-duc-Trol for production control.

For more facts request No. 2 on reply card.

### Organization Chart

**Management Control Charts Co.** A typist, a typewriter and typing paper are all that is needed to keep this interchangeable organization chart up to date. The chart comes in any size, and uses photographs for sharp prints. It is a handy training aid, and has completely moveable and reusable parts. It is extremely easy to change, and eliminates costly re-drafting of other types of organization charts.

For more facts request No. 1 on reply card.

### Visual Control Board

**Wassell Organization, Inc.** The new Vu-board, which shows all important data, sets up and operates easily, has unlimited uses for scheduling, charting, dispatching, etc., is offered at low cost by this firm.

For more facts request No. 6 on reply card.

### Microdials

**Borg Equipment Div.** Free catalog BED-A90 gives complete information on Borg direct-reading

microdials, available in wide variety of models, to obtain accurate first readings, solve a knotty human engineering problem.

For more facts request No. 5 on reply card.

### Filing System

**Wassell Organization, Inc.** For modern secretaries, firm reports Corres-file brings all important papers to her fingertips, cuts time in half, saves costly labor, increases efficiency, doubles capacity without sacrificing space.

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## New Services

### Data Processing Digest

**Canning, Sisson & Assoc.** Data Processing Digest is a monthly service, containing abstracts on Electronic Data Processing. Articles are reviewed from almost 100 periodicals monthly. Books are also abstracted.

For more facts request No. 8 on reply card.

### Investments

**Hamilton Management Corp.** Through Hamilton Funds, Inc., a managed common stock investment fund, this firm offers lump sum or monthly investment plans to fit any budget. Interested persons can inquire without obligation. Firm recently declared another quarterly dividend.

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### Income Fund

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## Other New Products

### Operations

**FILTER REPLACEMENT:** A new Micro-pleat-type, high-efficiency filter replacement element for existing designs of main fuel line filters on aircraft such as DC-4, 6 and 7 models is now available from Bendix Filter Division, Bendix Aviation Corporation. The element is made of pleated cellulose material that has a 10-micron rating. The filter material is supported by corrosion-resistant metal end caps and a perforated metal core. Gaskets are adhesive-bonded to each of the end caps. These gaskets assure a tight seal on raised edges in the filter unit. The element measures 3 1/2-in. dia. by 6 1/2-in. long. It has a rated pressure differential ranging from approximately 0.01 psi at 2-gpm flow to 0.8-psi at a 10-gpm rate of flow.

For more facts request No. 101 on reply card.

**FREIGHT CART CIRCULAR:** Operating and design features of a new line of four-wheel freight carts with removable and replaceable hardwood decks are described and pictured in a new circular available from Lewis-Shepard Products, Inc. The four-page, two-color presentation, designated as Circular 29-E, contains complete details on the FloorMaster freight carts, which are available for either manual, in-floor dragline or overhead dragline operation. To replace the decks on the carts, which have a 2000-pound capacity, it is simply necessary to remove six screws.

For more facts request No. 103 on reply card.

**VALVE CATALOG:** A new catalog on the company's line of low flow servo valves has just been issued by Moog Valve Co. Inc. CATALOG 210 contains a series of curves and schematics which highlight the design and performance characteristics of Moog's low flow servo valves for military, industrial and research application. Three-color, 6 1/2-page brochure features a detailed glossary of servo valve terms as well as a detailed cutaway photograph of a typical valve in this series. The company points out that more than 300 different models of valves in this series have been produced for specific application.

For more facts request No. 106 on reply card.

**CUTTING LANCE BOOKLET:** A new 4-page folder, "Introducing the New Oxweld ACL-3 Powder Lance," describes a revolutionary new tool capable of slicing through concrete or metal of any thick-

ness. Accurate control of intense heat is the key to operation of the new lance developed by Linde Company, Division of Union Carbide Corporation. No known material can withstand the piercing action of the new ACL-3 Powder Lance. The booklet outlines the origin, principle, and scope of the powder-lancing process. It also describes cost-saving applications in steel mills, foundries and on construction and demolition jobs. Complete specifications and ordering information for the lance and lancing accessories are included. For more facts request No. 108 on reply card.

**LADDER LEVELER:** A new automatic ladder leveler, field-tested for seven years, is now available for use by painters, construction and maintenance crews, and other users of extension or single type ladders. The device is fully automatic—to permit setting ladders on stairs, sloping roofs or on any uneven surface from 0" to 27". Anderson Architectural Steel Products, Inc.

For more facts request No. 137 on reply card.

**MINIATURIZED VARIABLE DISPLACEMENT PUMP:** According to Vickers, Inc., a major design breakthrough has made available a new 3000-psi variable-displacement pump capable of flow up to 9.7 gpm at 24,000 rpm from a 2.4-lb. package, which is approximately equal in size to current fixed displacement models, provides weight saving of 48% and space saving of 70%.

For more facts request No. 145 on reply card.

### Administrative Aids

**HANDLING CASE HISTORY:** A case history of how one of the world's three largest liquor wholesalers increased the speed of the materials handling operation in its warehouse by 75 per cent is now available free from Lewis-Shepard Products, Inc. The six-page, two-color presentation, designated as Case History Bulletin 509-1, is fully illustrated with a series of action photos taken right in the warehouse. The bulletin describes and pictures the complete handling cycle in this unique West Coast warehouse, from receiving to storage to shipping.

For more facts request No. 104 on reply card.

**NEW INDIRECT LIGHTING:** Sunbeam Lighting Co. has just introduced "Sightline," a new, totally indirect lighting system that "takes the squint out of seeing," to achieve, say the designer-developers, "a never-before attained standard of excellence for indirect lighting." Uniform brightness ratios of new "Sightline" create the illusion of a luminous ceiling.

For more facts request No. 138 on reply card.

### Scientific

**TRANSISTOR SERVO AMPLIFIERS:** Bulletin is a two-page, illustrated brochure that describes the complete performance specifications, and application data of Librascope's Transistor Servo Amplifier. With a 3/4 watt output, the light-weight encapsulated components use silicon transistors to provide reliable performance over wide temperature range. The transistor servo amplifiers discussed in the brochure have a voltage gain of 100, with an input impedance of 100K ohms. Also featured in the complete brochure is information concerning dimensional data and wiring diagrams. Listed in the literature are specifications about power requirements of 28 volts DC at 60 milliamps for full output.

For more facts request No. 102 on reply card.

**ELECTRONIC TIMER:** When using a "moving-film" camera for analog recording, it is generally necessary to establish a time base with precisely measured time intervals. The ALINCO Model 4006 is a refined device for such needs. It gives precise timing intervals by supplying time base voltage pulses to facsimile lamps for recording with drum-type, strip chart, and special cameras; voltage pulses for intensity modulation of cathode-ray oscillographs; and on-off control of a facsimile lamp for zero reference in "delay" measurements. Elapsed time is displayed by five decimal counting units that serve as frequency dividing networks, and the output provides a means for obtaining timing marks of 1, 0.1, 0.01, and 0.001 second.

For more facts request No. 107 on reply card.

**VARIABLE TRANSDUCER:** A miniature, single coil, variable reluctance, diaphragm type transducer to be used as the variable inductor in commercially available inductance and reactance controlled FM/FM sub-carrier oscillator systems has been announced by Ultradyne, Inc. Differential, gage and absolute models are offered with a wide selection of pressure ranges between 0-10 psi and 0-5000 psi. Called the S-60, the unit combines very low sensitivity to shock, vibration and acceleration (.001%/g to .01%/g, or less, depending on pressure range) with a rise time of 75 to 150 microseconds. The basic size is 7/8" diameter x 7/8" long. High overload rating and high diaphragm burst pressure protect the gage where transient overpressures exist.

For more facts request No. 109 on reply card.

**GYRO TRANSDUCER:** A gyro transducer for control of airborne vehicles or instrumentation telemetry systems has been developed by the Clary Corp. Consisting of three gyros mounted so as to sense motion about the roll, yaw and pitch axes of a vehicle, the free gyros provide an accurate reference, in electrical signal form, which is proportional to displacement about the outer gimbal axis.

For more facts request No. 141 on reply card.

**MINIATURE TV CAMERA:** Development of the world's smallest—and first fully transistorized—automatic television camera has been announced by the Dage Television Div., Thompson Products, Inc., a major breakthrough in the field of electronic miniaturization. First delivery of the revolutionary new TV camera was made recently to the Signal Corps at Ft. Monmouth, N. J.

For more facts request No. 142 on reply card.

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Caterpillar DW20 Tractor with No. 456 LOWBOWL Scraper is pushloaded by a D9 Tractor equipped with a pushcup. With eight other DW20s it is working on construction of runways, taxiways and other facilities at

Bergstrom Air Force Base, near Austin, Texas. Altogether, the fast-moving DW20s are getting up to 20,500 cu. yd. in a 20-hour working day on hauls of 1 to 2½ miles round trip.

## Job report on Bergstrom A.F.B. construction

Near Austin, Texas, the H. B. Zachry Company is building runways, taxiways and other facilities for the new Bergstrom Air Force Base. This is a big operation—2,370,000 cu. yd. of excavation. In addition, it calls for 300,000 yd. of select base material and 503,000 yd. of concrete pavement. Runways are 12,250 ft. long, 300 ft. wide.

Work started in April, 1957, and is being handled by nine Caterpillar DW20 Tractors with No. 456

Caterpillar D8 Tractor pulling a disk harrow and a D8 pulling a sheepsfoot roller are among the many pieces of Caterpillar-built equipment working on runway construction. The D8s feature dependable Cat Engines, operator-convenient, power-boosted controls and built-in quality for long life.

LOWBOWL Scrapers, two Cat D9 Tractors, six D8s, two D7s and seven No. 12 Motor Graders.

The DW20s are getting up to 20,500 cu. yd. in a 20-hour working day. Rough material, too—clay, limestone conglomerate, shale and black gumbo. Round-trip hauls have varied from 1 to 2½ miles.

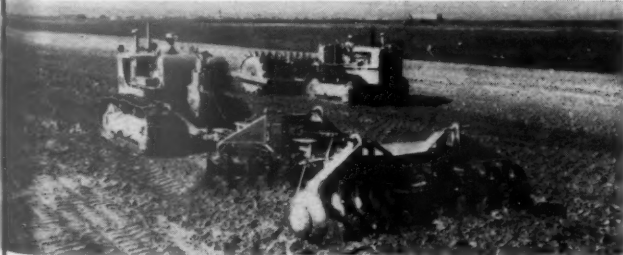
Powered by a Cat Diesel Engine, the four-wheel DW20-No. 456 rig has the power and stability for big-volume hauling at high speeds. It's rated at 18 cu. yd. struck, 25 heaped. Ten-speed transmission offers a selection of speeds to handle any job. Easy to see why the Caterpillar DW20-No. 456 wheel unit has a proved economy record!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

# CATERPILLAR

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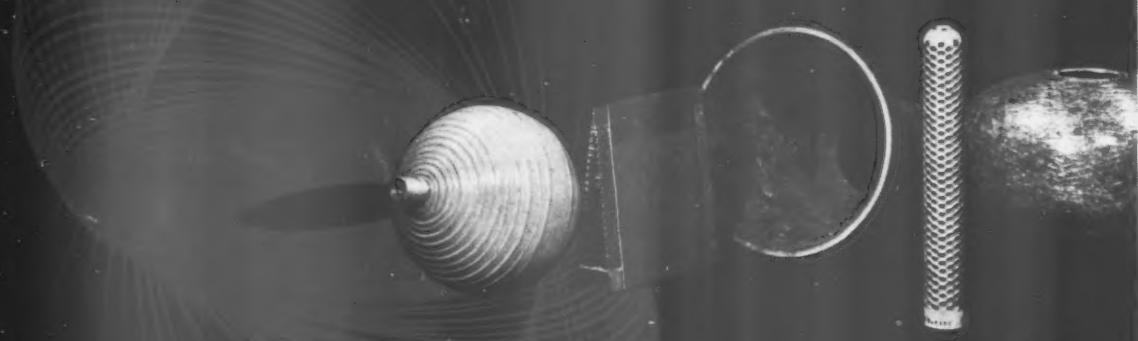


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